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ABSTRACT

This study explores the career development of women during the five year period after high school, examining the determinants of that development and presenting data which may provide a basis for better vocational guidance and a theory of occupational choice in women. The study employs longitudinal data from the Project TALENT data bank and 17,009 women were analyzed in total. From the predictor variables employed, career choices of women after high school could be predicted with some degree of accuracy. Post high school experiences were the best determinants of career outcomes. Educational attainment and marital-familial status best predicted whether women would choose careers in the professions or be housewives and office workers. Of the personal variables, scholastic aptitude and socioeconomic status as well as early career choices, were the best predictors. However, different clusters of characteristics were predictive of different outcomes. (EK)

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BUREAU OF SOCIAL SCIENCE RESEARCH, INC.

WASHINGTON, D. C.

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Helen S. Astin

March, 1970

SUMMARY

This study explores the career development of women during the five-year period after high school, examining the determinants of that development and presenting empirical data which may provide a better basis for vocational guidance as well as for a theory of occupational choice in women. The study addresses itself to three questions:

1. What personal characteristics and environmental experiences affect young women's career decisions?

2. How stable is career choice between two points in time, and what are the personal and intellectual characteristics of women who persist in a career versus those of women who change their plans?

3. How well can career patterns be predicted five years after high school, and what measures are the best predictors of career outcomes?

The study employs longitudinal data from the Project TALENT data bank. The subjects in the sample were initially tested in 1960, when they were seniors in high school, and the follow-up data were obtained in January of 1966, five years after high school. Approximately 100,000 twelfth grade students attending more than 1,300 secondary schools in all parts of the United States were assesed during 1960, and of these students approximately 32,000 responded in 1965.

The sample in this longitudinal panel consists of 17,009 women, and the weighted N represents 7,901,772.

Most of our analyses (multiple discrimant analysis) were based on a sample of 5,387 women for whom complete data were available on the measures utilized during the two assessments (1960 and 1965). Estimates of stability and change of career choice over time were computed on the weighted N; comparison of the characteristics of women changing their plans with those maintaining the same plans over time was based on the total sample of 17,009 cases.

Criterion Groups: On the basis of their career plans as stated in the five-year follow-up questionnaire, we classified the women into ten career groups: Natural Sciences, Professions, Teaching, Health Fields, Business, Arts, Social Service/Sciences, Office Work, Housewife, and Miscellaneous.

Predictor Variables: Personal characteristics were assessed by measures of ability, interests, personality, and home background. They were obtained when the students were in the twelfth grade. Environmental variables included occupational, educational, and domestic experiences during the five years after high school.

Method of Analysis: Multiple discrimant analysis, the primary method, was utilized because it enables the investigator to differentiate among groups on the basis of a large number of antecedent variables. Multiple correltion and the beta weights of variables that entered the equation in the prediction of each career group were also computed. The difference in the mean scores of the women who maintained the same plans over time and those who changed their plans were evaluated by t ratios.

Results: From the predictor variables employed, the career choices of women five years after high school could be predicted with some degree of accuracy. The environmental variables, or post-high school experiences were the best determinants of career outcomes. Educational attainment and marital-familial status best predicted whether women would choose to pursue careers in the sciences, professions and teaching, or to be housewives and office workers. Of the personal variables, scholastic aptitudes--in particular those in the area of mathematics--and socioeconomic status (SES), as well as early career choices were the best predictors. However, different clusters of characteristics were predictive of different outcomes. For example, high scholastic aptitude and high SES differentiated the sciences, professions and teaching, whereas interest measures and early choices differentiated the arts, the health fields, and business. Moreover, interests and aptitudes often preferred by and observed among men differentiated women who chose the sciences and professions from those who chose teaching, the health fields, and office work.

With respect to the patterns of stability and change in career plans, over time, the three most popular occupations were teacher, office worker, and housewife. Most of those who changed their fields usually made new choices in one of these three groups. The observed changes resulted in greater differentiation among the groups with respect to aptitudes and interests. Brighter women either maintained or raised their vocational aspirations, whereas the less academically capable women planned on less demanding careers.

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PERSONAL AND ENVIRONMENTAL FACTORS IN CAREER DECISIONS OF YOUNG WOMEN

This study explores the career development of women during the five-year period after high school. It was initiated by queries such as: (1) What personal characteristics and environmental experiences affect young women's career choices? (2) How stable is career choice between these two points in time? (3) How well can career patterns five years after high school graduation be predicted from measures of selected personal characteristics and environmental experiences? and, (4) Which of the personal and environmental variables utilized are the better predictors?

To give the reader a greater understanding of the problem of vocational choice and development, a brief review of some of the theoretical positions and the relevant empirical data follows.

Theoretical Orientations and Conceptual Frameworks

Super (1951, 1953, 1957), Roe (1956), Ginzberg et al. (1951), and Holland (1959) look at vocational behavior as a developmental process whereby a person makes vocational decisions that are congruent with his or her self-concept or personal orientation. Tiedeman (1958, 1963), on the other hand, takes a psychosocial approach to the matter. He sees the need for emphasizing more the person's social environment and the influence that it exerts upon his vocational development. He also stresses the decision-making process that underlies vocational behavior. With respect to this process, Hilton (1962) suggests that the primary motive in

decision making is to maintain a low level of cognitive dissonance. Whereas Strong (1943) sees interests as the primary factors in decision making, Rosenberg (1957) reports that in vocational decision making a person's values are the primary influences. Holland (1962) agrees with this view, but he adds that a person searches for a work environment that is congruent with his personal orientation. Blau et al. (1956), on the other hand, perceive the decision-making process as being strongly governed by expectations of future outcomes.

Besides attempting to construct a theory of vocational development, researchers have concerned themselves with formulating concepts geared to operational definitions and measurement. Thus empirical research has attempted to conceptualize and measure variables that account for occupational behavior. On the one hand, personal variables, can be defined in terms of a person's sex, abilities, aptitudes, interests, values, needs, and motives, and, on the other hand, environmental variables are reflected by one's SES, parents' attitudes, peers, and experiences with school and other institutions.

Empirical Research

Many studies have investigated the stability of occupational choices over periods of time (Clark, 1961; Campbell, 1965; Davis, 1962; Holland and Nichols, 1964; Rosenberg, 1957; Astin, 1963). Furthermore, there is a wealth of studies on the prediction of career choices. Roe (1953), using the life history approach and some test data, compared male psychologists and anthropologists to biologists and physicists. She found that anthropologists and psychologists make about the same scores on verbal tests. However, psychologists do significantly better on measures of mathematical

ability and of spatial relations. Cultural background and sex were also found to be differentiating variables in career choice. For example, women choose teaching more often, whereas men prefer careers in engineering. Ten years later Astin (1963), studying the career expectations of graduating college seniors, reported that career choices could be predicted from major field choices as freshmen.

Given a group of students aspiring to a certain career, those who deviate most from the majority are the ones who are most likely to change to a different choice. For example, occupations that are chosen more often by men initially become more masculine (i.e., contain a larger proportion of men), just as occupations that are initially preferred by women recruit more women over time. Thus, women who at first choose masculine occupations (such as engineering) tend to change to more feminine occupations (such as teaching) later on. Similarly, occupations that initially attract the more academically able students tend to lose relatively more of their less able students later on. (Nichols, 1964; Davis, 1965; Werts, 1966.) Moreover, Astin (1967) reported that career changes occur as a result of personal development and of educational experiences that enable students to define their vocational goals more realistically.

Attempts to measure vocational maturity have had problematic results. Super (1960), in a longitudinal study of 105 boys in the ninth grade, tried to measure vocational maturity at different developmental stages. Similarly, Gribbons and Lohnes (1969) initiated a longitudinal study designed to measure and describe career patterns from early adolescence into early adulthood. One of their goals was to develop a scale of vocational maturity that could predict career patterns. They reported (a) that vocational

maturity was predictive of subsequent vocational aspirations and plans; and (b) that the educational and occupational goals of young people become more realistic over time.

Cooley (1963) in his study of Career Development of Scientists, and Cooley and Lohnes (1968) in their monograph Predicting Development of Young Adults attempted to predict career outcomes and to differentiate career groups on the basis of antecedent personal characteristics. They reported that differences among individuals which result in different choice behaviors can be adequately described by locating individuals as points in a multidimensional behavior space. Employing the group multiple discriminant analysis technique, they illustrated the separation of career groups and from the loadings of the predictor variables, they defined the different dimensions.

With respect to the career development of women, however, there has been very little research or attempts at constructing a theory.

Tyler (1964) conducted a longitudinal study of interests, abilities, and personal and social characteristics at different developmental levels in order to identify the antecedents of scientific interests in boys and of career interests in girls. She reported that science interests, as measured by the Strong Vocational Interest Blank (SVIB), in most cases crystallize before the age of 14 and that they tend to persist. The male subjects with scientific interests and the female subjects with career interests were differentiated from those without such interest primarily by their having masculine-oriented activities and interests. Although abilities and achievements did not differentiate the boys with science interests from those with nonscience interests, the career-oriented girls

exhibited greater abilities and achievements at all developmental levels than did the noncareer-oriented girls.

In 1964, Roe, after giving considerable thought to the meaning of "career" for American women, stated that "studies of occupational histories for men and women may require different concepts." Some studies have focused on the behavioral and personal characteristics of career-oriented vs. noncareer-oriented women (Rand, 1968; Elton and Rose, 1967; Harmon, 1967; and Gysbers, Johnston,and Gust, 1968). Astin, (1968a, 1968b) using Project TALENT data, studied the career development of girls during the high school years. The present study may be considered an adjunct to those studies, since it attempts to replicate the design, but with the time focus shifted from the high school years to five years after high school.

Objectives of Study

The study reported herein aimed at gaining some insights into the psychosocial aspects of career development in young women. It is hoped that these insights will help young women to make more appropriate educational plans and vocational decisions, especially since work is no doubt going to become a very important part of a woman's life.

The war years saw a shortage of male labor; consequently, there was an influx of women into the labor force. Although immediately after the war, the proportion of working women decreased somewhat, still the overall proportion has recently been increasing steadily. One may describe the post-war years as a time of revolution in women's employment. In 1940, the Census indicated that the proportion of females (14 years and over) in the labor force was 27.4 percent and by 1965 this proportion had risen to 36.7 percent. In actual

numbers, the increase is even more phenomenal: from 14 million to 26 million (Statistical Abstracts of the U.S., 1967). More recently, such organizations as NOW (National Organization of Women), Radical Women, and other women's liberation movement groups have given added impetus to the cause of women's actualization and participation in the world of work,and we may expect to see continuous and large increases of women in the labor force. Thus an understanding of the factors that influence the career development of women becomes of great importance.

This study has two goals: (a) to isolate antecendent factors of later career choices (from high school graduation to five years after high school) and (b) to determine the factors that relate to career change and career stability during the five post-high school years. The specific questions it tries to answer are as follows:

1. What personal characteristics of twelfth grade girls predict their vocational choices five years after high school?

2. What college and other post-high school environmental experiences affect the career plans of women?

3. What are the personal and intellectual traits of women who persist in a career as opposed to the traits of those who change their career plans?

Method

The Sample

The study utilized longitudinal data on a national sample of women from the Project TALENT Data Bank. The sample consisted of female subjects who had been tested in 1960 when they were seniors in high school. They

were followed up in the fall of 1961 (one year after high school) and again in January 1966 (approximately five years after high school). Project TALENT was initiated by the American Institutes for Research and the University of Pittsburgh with support from the U.S. Office of Education. In 1960, approximately 100,000 twelfth grade students in more than 1,300 secondary schools were selected on a random stratified sampling basis. The stratifying variables were: (a) school category: public, parochial, and private; (b) location: geographic region and city size; (c) size of senior class. The 1960 sample was tested for two days with a battery of tests and questionnaires that yielded about 2,000 items of information about each student, including her aptitude and achievement test scores, and information on her activities, preferences, aspirations, and family background (Flanagan, et al., 1962).

In 1965, follow-up data were obtained from about a third of the original respondents. The 1965 follow-up was a mailed questionnaire (see copy in Appendix B), which contained items of information on employment, education, and marital history, since 1960.

Because of this study's special focus and the method of analysis planned, the sample for most of the analyses was a subsample of the original Project TALENT group. The inclusion of a subject in the subsample depended on whether she had provided data in the 1960 survey as well as in the 1965 follow-up. Thus the study sample comprised 17,009 cases. In order to equalize the Ns in the ten career groups somewhat, we resampled within each career category (Table 1). The resultant sample of 7,002 cases was further reduced to 5,387 because data on some items of information selected for our study were incomplete.

TABLE 1

DISTRIBUTION OF SUBJECTS IN THE TEN CAREER GROUPS BEFORE AND AFTER SAMPLING

Career Groups	Ns in 1960	Resampling Ratio	Ns after Resampling
Natural Sciences	454	All	454
Professions	355	All	355
Teaching	3,694	1/3	1,231
Health Fields	2,144	1/3	715
Business	501	All	501
Arts	555	All	555
Social Service/Social Sciences	661	1/2	330
Office Work	4,539	1/3	1,513
Housewife	1,463	1/3	487
Miscellaneous	2,643	1/3	881
Total	17,009	-	7,022

This sample was used for the multivariate analyses. However, all 17,009 cases were used to examine patterns of stability and change in career choices. The large shrinkage in sample size yielded a nonrepresentative sample which does not permit accurate estimates of population parameters. However, having a representative sample was not a crucial factor, since our primary interest was in the relationship and interaction of the variables and in their influence on career choices. This process of sampling usually tends to increase the homogeneity of the sample, thus yielding lower correlation coefficients which in turn give more conservative estimates of the impact of the various factors on the criterion measures.

Instruments

The measures used (i.e., the predictor variables and the criterion variables) were developed from information furnished by the students in the sample during the 1960 and 1965 assessments. The selection of variables was based on an a priori judgment of measures that could be meaningful and useful as predictors of career choice.

Personal Variables

The 36 personal variables were test scores and other information obtained while the students were in the twelfth grade in high school: Five information test scores, six aptitude and achievement test scores, three temperament scales, four interest scores, ten measures of career plans, counseling experiences regarding college plans or future occupations, status of physical health, father's encouragement of going to college, socioeconomic index, grades in high school, and life goals.

The information test scores were designed to assess the student's knowledge in a large number of areas. In selecting the five areas, we tried to include some that would reflect masculine as well as feminine interests. The scores included were from subtests in Literature, Art, Mathematics, Mechanics, and Total Information (a composite of all the information subtest scores). The aptitude and achievement tests were selected to measure abstract thinking, verbal skills, and mathematical aptitudes. They included the following test scores: Total English, Reading Comprehension, Total Mathematics, Mechanical Reasoning, Creativity, and Abstract Reasoning. Although both Reading Comprehension and Abstract Reasoning can be viewed as tests of reasoning, Reading Comprehension is primarily a measure of verbal ability. The Creativity Test was designed primarily as a measure of ingenuity.

The Project TALENT Interest Inventory consisted of 17 interest scales, from which we selected four that represent divergent patterns of interest: Physical Science, Literary/Linguistic, Social Service, Business/ Managerial. The three temperament scales in our battery were: Sociability, Impulsivity, and Mature Personality.

The socioeconomic index was derived from nine items in the Student Information Blank (SIB); these included parents' education, parents' occupation, modern conveniences in the home, number of books in the home, and so forth. Life goals comprised two dichotomous variables (plans for a college degree, and plans for an advanced degree). Health status and grades in high school were continuous variables.

Scores on the measures of twelfth grade career plans were based on the ten career groups, which constituted the ten criterion variables.

Each career choice was classified into the appropriate group; this classification is discussed in the section below entitled Criterion Variables.

Environmental Variables

The 13 environmental variables were measures obtained from the five-year follow-up. They covered experiences since high school, such as educational status (i.e., whether the person has attended one or more colleges, whether she is or has been to graduate school, whether she has received a degree, and if so, what). Marital status, number of children, and number of jobs the subject has had since high school were also included in this category.

Criterion Variables

In any study of career development, the question of occupational classification is a difficult one. What are the most meaningful and appropriate categories into which to sort occupations? Various criteria have been used by researchers in classifying occupations: Some classifications have been made on the basis of activities performed; others on the personal characteristics of those in the occupations. The degree of skill required in an occupation has also been used as a basis for classification. This study employs an a priori classification of occupations that represents a compromise of the following considerations: research-based schemes, the limits imposed by the categories originally used in the Project TALENT Study, and the numbers of subjects in each category. The occupational information utilized for the development of criterion measures came from an open-ended question in the five-year follow-up survey. The responses to this open-ended question were coded into 31 careers by the Project

TALENT staff. Then these were used to develop our ten-group classification. These same 31 career choices were also listed in the Student Inventory Blank, a questionnaire the students completed while in the twelfth grade. Our classification was as follows:

1. Natural Sciences
   (Mathematician, physical scientist, biological scientist, engineer.)

2. Professions
   (Physician, dentist, lawyer, pharmacist, clergyman.)

3. Teaching
   (Teacher, librarian.)

4. Health Fields
   Nurse, medical or dental technician.)

5. Business
   (Businessman, accountant.)

6. Arts
   (Artist, entertainer, writer.)

7. Social Service/Social Sciences
   (Social worker, social scientist.)

8. Office Work
   (Secretary, office clerk, typist.)

9. Housewife

10. Miscellaneous
    (All other choices: sales; armed forces; protective, skilled structural service; farmer; and unclassified.)

Statistical Analysis

The study utilized two methods of analysis. The first, multiple discriminant analysis, dealt with the prediction of occupational choices five years after high school. The second utilized univariate statistics. In order to study occupational stability and change we employed *t* ratios to evaluate mean differences between those maintaining the same career

plans and those changing plans over the five-year span. The groups were compared on selected aptitude and interest measures.[1]

Since we wanted to assess the degree to which the personal characteristics of twelfth grade girls and their environmental experiences predict their vocational choices five years after high school, a multivariate statistical procedure --multiple discriminant analysis-- seemed most appropriate. The multiple discriminant analysis procedures enable one to summarize the predictive value of the antecedent variables by reducing them to a small number of discriminant functions. The discriminant functions separate the criterion groups on the basis of their centroids (group mean vectors), and dispersions (group variances). The composition of each function is reflected in the differential predictive value of each of the antecedent variables.

The discriminant analysis procedure also produces "centour" scores which reflect the extent to which a subject resembles the members in each of the ten career groups. The centour score is a converted discriminant score which is interpreted as a centile score. Therefore, the probability of a person's membership in a particular group depends on the similarity of his profile to the group's mean profile.

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[1]The multivariate discriminant analyses were performed utilizing the sample of 5,387 cases, whereas the univariate analyses were done with the sample of 17,009 cases. The distribution of career choices and shifts over time were based on a weighted sample of 7,301,372 subjects.

Since we were interested in examining the predictive value of each battery of tests (i.e., personal vs. environmental measures), we ran three discriminant analyses: one included the 36 personal variables obtained when the subjects were twelfth graders; the second included the 13 environmental variables since high school; and the third included both sets of variables (personal and environmental). In addition to the multiple discriminant functions, scale vectors, and centour scores, we also obtained multiple correlations and beta weights for each career group utilizing the three sets of variables.

The second set of analyses dealt with the question of stability and change in career plans. For this purpose, each subject was classified as a "stable," a "defector," or a "recruit" on the basis of her career choice in the twelfth grade and her career choice five years later. For instance, if she chose one of the natural sciences in the twelfth grade and the same career five years later, she was classified as a stable. If, on the other hand, she shifted to another choice, she was categorized as (a) a natural science defector and (b) as a recruit to the career she chose in the five-year follow-up survey. Consequently, the 17,009 subjects were classified in 30 subgroups:

1. Natural Sciences: Stables ($N = 58$); Defectors ($N = 317$); Recruits ($N = 30$);

2. Professions: Stables ($N = 38$); Defectors ($N = 237$); Recruits ($N = 48$);

3. Teaching: Stables ($N = 599$); Defectors ($N = 392$); Recruits ($N = 636$);

4. Health Fields: Stables ($N = 232$); Defectors ($N = 307$); Recruits ($N = 144$);

5. Business: Stables (N = 32); Defectors (N = 341); Recruits (N = 106);

6. Arts: Stables (N = 82); Defectors (N = 368); Recruits (N = 72);

7. Social Service/Social Sciences: Stables (N = 45); Defectors (N = 203); Recruits (N = 117);

8. Office Work: Stables (N = 369); Defectors (N = 818); Recruits (N = 394);

9. Housewife: Stables (N = 201); Defectors (N = 169); Recruits (N = 1,454);

10. Miscellaneous: Stables (N = 149); Defectors (N = 430); Recruits (N = 1,454).

The stables, defectors and recruits were compared on the following measures from the Project TALENT Battery: (a) Aptitude and achievement measures: Grand Total Information, English Total, Reading Comprehension, Creativity, Mechanical Reasoning, Abstract Reasoning, and Mathematics Total; (b) Interest measures: Physical Science, Literary/Linguistic, Social Service, and Business/Managerial. The subjects were also compared on high school grades and on socioeconomic status.

The statistical significance of mean differences on these measures between stables and defectors, stables and recruits, and defectors and recruits within each career group was evaluated by means of t ratios. In addition, the means and standard deviation on six achievement and interest measures for the total initial (twelfth grade) and total final (five years after high school) groups choosing each of the ten career fields were computed in order to ascertain the extent of differentiation among the groups over time. The results and discussion of the career stability and change patterns follow the presentation of the findings utilizing the multivariate analyses (multiple discriminant and multiple regressions.

Results and Discussion

Three separate discriminant analyses were performed using different sets of predictor variables. The rationale was that we wanted to ascertain the predictive value of early personal measures as compared with later environmental experiences and that we were interested in evaluating the interaction of personal variables with environmental experiences and in learning what effect environmental experiences have on career outcomes after the effect of personal characteristics is accounted for.

The results of the three separate discriminant analyses are presented below.

First Discriminant Analysis

The first discriminant analysis in the prediction of career plans five years after high school utilized the 36 personal measures as predictor variables, including 18 test scores, 15 items from the Student Information Blank (SIB)--ten of which comprised the students' career choices in the twelfth grade--cumulative grade point average in high school, information on whether the girls had had counseling about college or career, health status, and the degree to which the girls were encouraged by their fathers to go on to a college. Added to these was a socioeconomic index and the student's goals with respect to higher education. (See Appendix A for a list of all the variables used in the study.)

The criterion variables were the ten career groups. Each subject was classified into one of these groups on the basis of her career choice at the time of the five-year follow-up.

The discriminant analysis resulted in nine functions, of which the first eight yielded significant canonical correlations. However, here we present and discuss only the five first functions since they accounted for 90 percent of the discriminating information in the 30 variables. The discriminating information accounted for by each of the five functions was 37.70 percent, 25.10 percent, 12.80 percent, 8.45 percent and 5.86 percent respectively.

Table 2 presents the centroids of the groups in reduced space for each of the five discriminant functions. They are listed in rank order. Table 3 reports the significant weights of the variables for each of the five discriminant functions.

The first discriminant function separates the natural sciences, social service/social sciences, the professions, and teaching groups, (the last three having rather similar centroids of .890, .865 and .812) from the housewife and office work groups. The predictor variables with the highest weights on this function are Mathematics Information, Mathematics Total, Information Total, Literature Information, Reading Comprehension, aspirations for an advanced degree, and aspirations for a college degree. The predictor variables of twelfth-grade career choice of office work and business carried negative weights. Judging from the weights of the aptitude and achievement variables, the underlying dimension of this function may be interpreted as overall scholastic aptitude. Girls who made higher aptitude scores while in high school, were more likely to aspire to careers in the natural sciences, social services or the social sciences, the professions and teaching five years later, whereas those with lower academic ability tended to plan careers in office work or to be housewives. One may also interpret the separation

TABLE 2

CENTROIDS OF GROUPS IN REDUCED SPACE: 36 PERSONAL VARIABLES

Rank Order	First Discriminant Function	Second Discriminant Function	Third Discriminant Function	Fourth Discriminant Function	Fifth Discriminant Function
1	1.108 Sciences	0.386 Arts	2.108 Sciences	1.520 Arts	0.838 Sciences
2	0.890 Social Service	0.344 Teaching	0.703 Professions	0.195 Business	0.324 Arts
3	0.865 Professions	0.168 Business	0.639 Social Service	0.099 Professions	0.093 Health Fields
4	0.812 Teaching	0.132 Office Work	0.235 Business	0.099 Miscellaneous	0.079 Miscellaneous
5	0.540 Arts	0.074 Housewife	0.187 Arts	0.083 Social Service	0.052 Teaching
6	0.379 Health Fields	0.048 Social Service	0.182 Miscellaneous	0.021 Health Fields	0.014 Business
7	0.005 Business	-0.003 Sciences	-0.008 Housewife	-0.015 Housewife	0.000 Office Work
8	-0.274 Miscellaneous	-0.078 Miscellaneous	-0.050 Office Work	-0.135 Office Work	-0.039 Housewife
9	-0.504 Housewife	-0.285 Professions	-0.231 Health Fields	-0.138 Teaching	-0.621 Social Service
10	-0.670 Office Work	-1.745 Health Fields	-0.328 Teaching	-0.740 Sciences	-1.368 Professions
Can R	(.614)	(.501)	(.358)	(.291)	(.242)

Note: Sciences stands for Natural Sciences, and Social Service includes Social Service/Social Sciences.

TABLE 3

SCALED DISCRIMINANT VECTORS: 36 PERSONAL VARIABLES

First Discriminant Function		Second Discriminant Function		Third Discriminant Function		Fourth Discriminant Function		Fifth Discriminant Function	
Mathematics information	.75	"Teaching"	.37	"Natural sciences"	.66	"Arts"	.87	"Natural sciences"	.51
Mathematics total	.67	"Arts"	.18	Advanced degree plans	.40	Grades	-.20	"Arts"	.22
Information total	.65	"Office Work"	.14	Physical science interest	.36	Physical science interest	-.21	"Health Fields"	.19
Literature information	.61	College degree plans	.11	"Professions"	.32	"Office Work"	-.22	College degree plans	.18
Reading comprehension	.55	"Professions"	-.16	Mathematics total	.29	"Natural sciences"	-.29	Mechanical reasoning	.15
Advanced degree plans	.53	Physical science interest	-.18	Mathematics information	.24	Social service interest	-.29	Mature personality	-.14
College degree plans	.51	"Health Fields"	-.92	Information total	.21	"Teaching"	-.35	Advanced degree plans	-.19
"Teaching"	.50			Mechanical reasoning	.21			"Social Service"	-.42
Literary/linguistic interest	.49			"Health Fields"	-.21			"Professions"	-.64
English total	.47			College degree plans	-.27				
SES	.46			Social service interest	-.37				
Physical science interest	.44			"Teaching"	-.56				
Art information	.43								
Grades	.39								
Counseling about college	.37								
Creativity	.34								
Mechanical reasoning	.32								
Father's encouragement	.30								
Mature personality	.29								
Social service interest	.26								
Mechanical information	.24								
"Natural sciences"	.21								
"Business"	-.21								
"Office Work"	-.61								

Note: Words in quotes represent the twelfth grade career choice variable. Only the largest negative and positive weights are shown.

of the career groups as indicative of a career commitment dimension. That is, at one end of the continuum are careers requiring greater preparation and commitment, whereas at the other end are careers a woman can enter without much academic preparation. The high weights that tests of mathematical aptitude and achievement carry in the prediction of career outcomes five years after high school are of special interest. A similar finding was reported by Astin (1968) in predicting career choices of girls during the high school years. Girls from higher socioeconomic backgrounds were more likely to choose careers in the sciences (natural and social), the professions, and teaching, and this likelihood was even greater if they perceived their fathers as encouraging them to pursue higher education.

The second function separates the health fields as a career choice from the arts and teaching rather distinctly, since there is a negative centroid of 1.745 for the health fields as compared with a centroid of 0.386 for the arts and of 0.344 for teaching. The predictor variable with the greatest weight in this function is twelfth grade career choice in the health fields (-.92); on the other hand, early choices in the arts and teaching carried positive weights (.18 and .37 respectively). The dimension that emerges from this function might suitably be termed "early occupational commitment." Because of the early and specific training required in the health fields, such as nursing, we would expect girls going into that field to decide early and to hold to this choice over time, since the greatest predictor of this career outcome was a similar choice five years earlier.

The third discriminant function separates the natural sciences (centroid of 2.108), the professions, (centroid of 0.703) and the social service/social sciences (centroid of 0.639) from teaching (centroid of

-0.328), and health fields (centroid of -0.231). This dimension may be viewed as reflecting a masculine-feminine orientation. According to this dimension, girls who, in the twelfth grade, chose a natural science career, aspired to an advanced degree, had a strong interest in physical science, were likely, five years later, to plan careers in the natural sciences, the professions, or the social sciences rather than in teaching, the health fields, or office work, five years later. That the only aptitudes that carried positive significant weights on this function were Mathematics Total, Mathematics Information, and Mechanical Reasoning is also a reflection of this function.

The fourth discriminant function can best be interpreted as an artistic dimension. It separates rather distinctly the arts criterion group from the natural science group. The largest weight is carried by the twelfth grade choice of a career in the arts.

The last function that significantly separated the groups placed the natural science group at one end with a centroid of 0.838 and the professions at the other end with a centroid of -1.368. The social service/ social sciences group was also separated from the natural sciences with a centroid of -0.621. The significant predictors were twelfth grade career choices, with positive weights for the natural sciences and the arts and negative weights for the professions and social service/social sciences. Generally, the dimension here can be viewed as a "people vs. things" kind of orientation.

In summary, the first function in this analysis reflects an academic orientation; the second may be seen as early occupational commitment or early commitment to the health fields; the third as a masculine-feminine

dimension; the fourth as an artistic vs. scientific orientation; and the fifth as a people vs. things orientation. The most interesting fact to emerge from this analysis is that scholastic aptitudes, especially in the area of mathematics, and high educational aspirations are the best predictors of a career orientation among young women. Moreover, early career choices (such as during the twelfth grade) are predictive of similar career choices five years later.

A hits-and-misses classification to the career groups, on the basis of the 36 personal predictors, was also performed. The subjects were sorted into the ten occupational groups on the basis of their discriminant scores, which in turn were converted into centour scores. Table 4 reports the results. There were 2,981 hits (or correct placements) made. The overall hit rate was estimated at 41.79 percent. The criterion groups of teaching and the health fields had the highest hit rates (35.3 and 36.0 percent, better than chance, respectively). On the other hand, the predictions made about subjects with plans to enter the professions and the arts were the poorest.

Second Discriminant Analysis

The second analysis employed the 13 environmental variables. They were experiences that the subjects had had during the five years after high school, with respect to jobs, further education, and marital status (see the detailed list of variables in Appendix A). The first three significant discriminant functions accounted for 50.84 percent, 12.53 percent and 2.59 percent respectively of the discriminating information in the 13 predictor variables.

TABLE 4

HITS AND MISSES CLASSIFICATION: 36 PERSONAL VARIABLES

Career Groups	1 Natural Sciences	2 Profes-sions	3 Teaching	4 Health Fields	5 Business	6 Arts	7 Social Service/ Sciences	8 Office Work	9 House-wife	10 Miscella-neous	N
1	58	11	10	4	0	2	1	0	2	0	88
2	5	38	16	5	0	6	5	2	7	2	86
3	96	45	655	70	17	126	64	13	128	21	1235
4	16	35	24	232	0	9	15	3	31	11	376
5	10	10	23	5	15	14	4	9	42	6	138
6	11	9	20	4	2	81	7	0	14	6	154
7	20	18	33	11	3	14	45	0	17	1	162
8	21	15	72	33	6	33	14	124	413	32	763
9	55	47	192	101	20	105	35	107	923	70	1655
10	50	36	81	74	7	54	26	45	277	80	730
Number of predictions made	342	264	1126	539	70	444	216	303	1854	229	5387
Percent correct	16.9	14.4	58.2	43.0	21.4	18.2	20.8	40.9	49.8	34.9	
Expected by chance (%)	1.6	1.6	22.9	7.0	2.6	2.9	3.0	14.2	30.7	13.6	
Better than chance (%)	15.3	12.8	35.3	36.0	18.8	15.3	17.8	26.7	19.1	21.3	

Note: 41.79 percent hit rate.

The centroids of the groups are given in Table 5. Table 6 reports the positive and negative weights of the predictor variables. The first discriminant function separates the natural sciences, social service/social sciences, and teaching from office work and housewife. Having a B.A. degree, having attended more than one college[2] as an undergraduate, and having been to or attending graduate school at the time of the follow-up were important predictors. Having an A.A. degree carried a large negative weight. Being married and having children were also negative predictors for careers in sciences and teaching as opposed to being a housewife or doing office work. College and graduate school attendance differentiated girls with different career commitments and plans.

The second discriminant function separates the criterion groups on what appears to be a marital status dimension. The only high positive predictor was being single, while the high negative predictors were the variables being married and having children. The career groups with high centroids on the second discriminant function were professions, business, and office work as opposed to housewife. It appears that single girls approximately 23 years old, independent of their educational status, are more likely to plan careers in the professions, business, and office work than are married women, who often see their present and future career as that of a housewife.

The third discriminant function separates the natural sciences from the health fields. The most important predictor variable is graduate school

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[2]The variable "transferred colleges" indicates more that a person has continued in college, rather than dropping out after a short stay or never going to college. (See question #23 of the five year follow-up questionnaire in Appendix B).

TABLE 5

CENTROIDS OF GROUPS IN REDUCED SPACE: 13 ENVIRONMENTAL VARIABLES

Rank Order	First Discriminant Function	Second Discriminant Function	Third Discriminant Function
1	1.35 Sciences	0.60 Professions	0.82 Sciences
2	1.12 Social Service	0.53 Business	0.41 Professions
3	1.04 Teaching	0.52 Office Work	0.15 Social Service
4	0.68 Professions	0.30 Health Fields	0.05 Office Work
5	0.39 Arts	0.26 Arts	0.10 Miscellaneous
6	0.14 Business	0.23 Miscellaneous	0.01 Housewife
7	-0.09 Health Fields	0.20 Social Service	-0.07 Teaching
8	-0.28 Miscellaneous	-0.11 Sciences	-0.20 Business
9	-0.61 Housewife	-0.15 Teaching	-0.26 Arts
10	-0.62 Office Work	-0.41 Housewife	-0.29 Health Fields
Can R	(.713)	(.354)	(.161)

Note: Sciences stands for Natural Sciences, and Social Service includes Social Service/Social Sciences.

TABLE 6

SCALED DISCRIMINANT VECTORS: 13 ENVIRONMENTAL VARIABLES

First Discriminant Function		Second Discriminant Function		Third Discriminant Function	
B. A. degree	.89	Single	.78	Graduate school attendance	.62
Transferred colleges	.78	Looking for job	.20	Single	.19
Attended college	.77	Has worked full time	.18	High school graduate	-.10
Graduate school attendance	.61	Graduate school attendance	-.10	Has advanced degree	-.19
Single	.37	B. A. degree	-.14	Married	-.20
Has advanced degree	.14	Children	-.57	Has worked full time	-.31
Has worked full time	-.10	Married	-.84	Transferred colleges	-.34
Married	-.35			Attended college	-.37
Has children	-.45				
A. A. degree	-.89				

Note: Only the largest positive and negative weights are shown.

experience. Women who continue their education to graduate school were more likely to be planning careers in the natural sciences.

The second discriminant analysis indicates that educational experiences and marital status since high school are predictive of women's career choices five years after high school. College graduates and those who indicated that they have been transfer students, rather than having dropped out of or never been to college were more likely to plan careers in natural sciences, social service / social sciences, teaching, and the professions. Furthermore, graduate school attendance is a significant predictor of career plans in the natural sciences. Finally, single women were more likely to plan careers in the professions, in business, and in office work than were married women.

A hits-and-misses classification to the ten career groups, on the basis of the 13 environmental variables, yielded a hit rate of 49.91 percent. Table 7 reports the results of this sorting of subjects. The highest hit rate was for the teaching group (a 56.7 percent correct rate or a 33.8 percent better-than-chance rate). The second most easily predicted group was the housewife category (a 53.0 percent hit rate or 22.3 percent better-than-chance). The environmental predictor variables employed in this analysis were rather poor measures for predicting the health fields and social service/ social sciences careers, whereas, being married and having children were very helpful in predicting outcomes such as being or planning to become a housewife.

TABLE 7

HITS AND MISSES CLASSIFICATION: 13 ENVIRONMENTAL VARIABLES

Career Groups	1 Natural Sciences	2 Profes-sions	3 Teaching	4 Health Fields	5 Business	6 Arts	7 Social Service/ Sciences	8 Office Work	9 House-wife	10 Miscella-neous	N
1	9	0	70	0	0	0	0	4	4	1	88
2	6	5	39	0	1	0	0	18	14	3	86
3	16	13	932	0	6	6	0	52	179	31	1235
4	0	5	95	0	1	0	0	86	172	17	376
5	0	1	43	0	2	0	0	39	42	11	138
6	0	2	66	0	1	3	0	21	52	9	154
7	4	2	120	0	2	1	0	7	16	10	162
8	0	0	18	0	6	4	0	305	401	29	763
9	0	0	128	0	2	2	0	111	1396	16	1655
10	4	3	132	0	4	1	0	191	358	37	730
Number of predictions made	39	31	1643	0	25	17	0	834	2634	164	5387
Percent correct	23.1	16.1	56.7	0	8.0	17.6	0	36.6	53.0	22.6	
Expected by chance (%)	1.6	1.6	22.9	7.0	2.6	2.9	3.0	14.2	30.7	13.6	
Better than chance (%)	21.5	14.5	33.8	-7.0	5.4	14.7	-3.0	22.4	22.3	9.0	

Note: 49.91 percent hit rate.

Third Discriminant Analysis

The third discriminant analysis utilized 49 predictor variables: the first 36 personal variables and 13 environmental variables. Since these variables have already been described, we will present only the findings here. This analysis resulted in five significant discriminant functions, each accounting for 53.4 percent, 27.1 percent, 15.6 percent, 12.1 percent, and 9.6 percent, respectively, of the discriminating information in the 49 predictor variables.

The first function in this analysis discriminates the criterion groups of natural sciences, social service/social sciences, teaching, and the professions from the office work and housewife groups (Table 8). This distinction is similar to the one observed in the first and second analyses.

Table 9 presents the weights of the variables in each of the discriminant functions. The positive significant weights in the discrimination of the career groups (sciences, social service, teaching and the professions) from the noncareer orientation groups (office work and housewife) were carried by selected aptitudevariables and by college and graduate school attendance. On the other hand, being married and having children as well as holding an Associate of Arts degree were negative predictors of high career aspirations among young women.

It should be noted also that a high SES and the father's encouraging the girl to go to college continued to be important predictors of her career orientation five years after high school.

The dimension operating here is one of high aptitude and high educational aspirations. However, pursuing higher education and graduate training were better predictors than were the aptitude test scores, although

TABLE 8

CENTROIDS OF GROUPS IN REDUCED SPACE: 49 PERSONAL AND ENVIRONMENTAL VARIABLES

Rank Order	First Discriminant Function	Second Discriminant Function	Third Discriminant Function	Fourth Discriminant Function	Fifth Discriminant Function
1.	1.214 Sciences	0.273 Teaching	1.741 Sciences	0.516 Office Work	1.549 Arts
2	1.110 Social Service	0.244 Housewife	1.053 Professions	0.489 Business	0.216 Professions
3	1.079 Teaching	0.170 Arts	0.689 Social Service	0.449 Arts	0.114 Social Service
4	0.682 Professions	0.087 Office Work	0.512 Business	0.081 Teaching	0.072 Housewife
5	0.422 Arts	0.008 Business	0.333 Arts	0.072 Miscellaneous	0.067 Miscellaneous
6	0.050 Business	-0.082 Miscellaneous	0.278 Office Work	-0.030 Health Fields	0.066 Business
7	0.011 Health Fields	-0.142 Social Service	0.239 Miscellaneous	-0.087 Professions	-0.005 Health Fields
8	-0.287 Miscellaneous	-0.202 Sciences	-0.198 Housewife	-0.095 Social Service	-0.120 Teaching
9	-0.628 Housewife	-0.678 Professions	-0.308 Teaching	-0.310 Housewife	-0.377 Office Work
10	-0.661 Office Work	-1.794 Health Fields	-0.413 Health Fields	-1.546 Sciences	-0.517 Sciences
Can R	(.731)	(.521)	(.395)	(.348)	(.310)

Note: Sciences stands for Natural Sciences, and Social Service includes Social Service/Social Sciences.

TABLE 9

SCALED DISCRIMINANT VECTORS: 49 PERSONAL AND ENVIRONMENTAL VARIABLES

First Discriminant Function		Second Discriminant Function		Third Discriminant Function		Fourth Discriminant Function		Fifth Discriminant Function	
B. A. degree	.86	"Teaching"	.28	"Natural sciences"	.47	Single	.52	"Arts"	.80
Transferred colleges	.76	"Office Work"	.24	Single	.47	Has worked full time	.22	SES	.23
Attended college	.75	Children	.21	Advanced degree plans	.32	"Arts"	.21	Children	.22
Mathematics information	.60	Married	.20	"Professions"	.29	Mechanical reasoning	-.21	Art information	.21
Grad. sch. attendance	.59	Mathematics information	-.21	Physical science interest	.27	Total information	-.22	Literature information	.13
Mathematics total	.55	"Professions"	-.22	Children	-.24	Physical science interest	-.24	Graduate school att.	-.15
Information total	.52	Physical science interest	-.27	Social service interest	-.32	Advanced degree plans	-.25	"Natural sciences"	-.16
Literature information	.49	"Health Fields"	-.87	"Health Fields"	-.35	Mathematics information	-.25	Business/managerial interest	-.17
"Teaching"	.47			"Teaching"	-.42	Mathematics total	-.29	Social service interest	-.25
Reading comprehension	.44			Married	-.49	Children	-.40	"Teaching"	-.26
College degree plans	.43					"Natural sciences"	-.46	"Office Work"	-.34
Advanced degree plans	.43					Married	-.57		
Literary/linguistic interest	.41								
English total	.38								
SES	.38								
Single	.35								
Art information	.35								
Physical science interest	.34								
Grades	.33								
Counseling about college	.30								
Abstract reasoning	.29								
Creativity	.27								
Father's encouragement	.25								
Mature personality	.24								

TABLE 9--Continued

First Discriminant Function	Second Discriminant Function	Third Discriminant Function	Fourth Discriminant Function	Fifth Discriminant Function
Social service interest .22				
Married -.33				
Children -.42				
"Office Work" -.48				
A. A. degree -.86				

Note: Only high positive and negative weights are listed. Words in quotes represent twelfth grade career choices.

both sets of variables were important. Nevertheless, the best predictor was completing college.

In the second function, the health fields (centroid = -1.79), and the professions (centroid = -.68) were separated from teaching and housewife. The predictor variable of choosing a career in the health fields while in high school carried the greatest weight (-.87). As was discussed earlier, the dimension is one of early occupational commitment since an early career choice in one of the health fields was the best predictor of the same career choice five years later. On the basis of its predictors, we may call the third function a masculine-feminine orientation which separates careers in the natural sciences, the professions, and social service/social sciences from those such as nurses and medical or dental technicians, teachers, and housewives. The best predictor variables were choosing a natural science career while in high school, being single five years after high school, and having aspirations for an advanced degree while in the twelfth grade. In other words, girls with these attributes were more likely to be planning careers in the natural sciences or the professions five years after high school. On the other hand, girls, who in the twelfth grade chose careers in the health professions or teaching and were married at the time of the follow-up, were likely to be planning at that time on careers in the health fields, in teaching, or just as housewives.

The fourth discriminant function separated the choices in office work and business, from choices in the natural sciences. Being employed full time after high school and being single were the best predictors of office work, and business careers five years after high school. On the other hand, high aptitude scores and high eduational aspirations were negative predictors of such career outcomes.

The fifth significant discriminant function can best be described as an artistic orientation. It separates the arts group from all other career groups and, in particular, from the natural sciences and office work groups. The largest weight was carried by the predictor variable of a career choice in the arts while in high school. Coming from a high socio-economic background and making high scores on the Art Information Test while in high school were also significant predictors. In addition, having children carried a significant weight. This finding indicates that women with children can and do pursue careers in the arts, since some artistic work can be done at home.

The results that emerged from the third discriminant analysis indicate that graduation from college is the best predictor of career choices in the natural sciences, social service/social sciences, teaching, and the professions, whereas nongraduation predicts doing office work and being a housewife. Another noteworthy fact is that an early commitment--i.e., a twelfth grade career choice in the health fields, the natural sciences or the arts--was predictive of similar career choices later on. Moreover, high aptitudes, especially in mathematics, a high SES, and an encouraging father still remain important predictors of a career orientation.

The hits-and-misses classification, utilizing the 49 predictor variables, is presented in Table 10. There were 2,714 correct classifications (or a 50.38 percent better hit rate). The teaching career group had the highest rate of correct placements (45.8 percent better than chance). Next came the office work and the health fields, with 36.8 percent and 36.2 percent, respectively, better than chance. Predictions were incorrect most often for the professions and the arts: only 15.6 percent and 16.7 percent, respectively, better than chance.

TABLE 10

HITS AND MISSES CLASSIFICATION: 49 PERSONAL AND ENVIRONMENTAL VARIABLES

Career Groups	1 Natural Sciences	2 Profes-sions	3 Teaching	4 Health Fields	5 Business	6 Arts	7 Social Service/ Sciences	8 Office Work	9 House-wife	10 Miscella-neous	N
1	<u>56</u>	11	13	4	1	1	2	0	0	0	88
2	5	<u>38</u>	17	5	0	6	4	4	4	3	86
3	85	39	<u>755</u>	67	10	101	58	22	78	20	1285
4	12	30	21	<u>231</u>	0	8	12	14	39	9	376
5	7	7	21	5	<u>18</u>	14	4	22	29	11	138
6	8	8	28	4	2	<u>72</u>	4	2	22	4	154
7	19	17	44	11	1	13	<u>45</u>	1	7	4	162
8	6	14	31	33	13	27	9	<u>264</u>	313	53	763
9	27	25	105	101	8	80	17	106	<u>1141</u>	45	1655
10	40	32	64	74	11	46	20	83	266	<u>94</u>	730
Number of predictions made	265	221	1099	535	64	368	175	518	1899	243	5387
Percent correct	21.1	17.2	68.7	43.2	28.1	19.6	25.7	51.0	60.1	38.7	
Expected by chance (%)	1.6	1.6	22.9	7.0	2.6	2.9	3.0	14.2	30.7	13.6	
Better than chance (%)	19.5	15.6	45.8	36.2	25.5	16.7	22.7	36.8	29.4	25.1	

Note: 50.38 percent hit rate.

Using the 49 variables, we examined the similarities and differences among the career groups. The Mahalanobis distance matrix summarizes the discriminant analysis results on the basis of similarities and differences in the profiles of the groups (see Table 11). The numerical values indicate the similarity between the groups; the smaller the number, the greater is the resemblance between that pair.

An inspection of the results in Table 11 indicates that women with career choices in the natural sciences, the professions, and social service/social sciences are very different from women with plans to be housewives, to do office work, or be in business. Moreover, the women with choices in the natural sciences differ more from women aspiring to the professions such as medicine and law than from women with choices in the Social Sciences. The interests, aptitudes, and life experiences of women in teaching and the professions seem more similar to one another than they do to those of women in the natural sciences.

Summary of the Results of Discriminant Analyses

A brief comparison of the findings that resulted from the three discriminant analyses follows; it is intended to highlight the value of the different sets of variables in predicting career outcomes over time. The four dimensions that emerged as orientations to career outcomes were (1) An aspiration for higher education or intellectual dimension; (2) marital status or home commitment dimension; (3) an early career commitment dimension, and (4) a masculinity-feminity dimension.

The first orientation--aspiration for higher education or intellectuality--was the most important predictive dimension of career choices of

TABLE 11

MAHALANOBIS DISTANCE MATRIX: 49 PREDICTOR VARIABLES

Career Group	1 Natural Sciences	2 Profes-sions	3 Teaching	4 Health Fields	5 Business	6 Arts	7 Social Service/ Sciences	8 Office Work	9 House-wife	10 Miscella-neous
1	0.00	10.89	9.36	15.69	11.66	13.37	7.71	15.81	15.17	12.13
2	10.89	0.00	7.12	8.89	7.00	8.57	5.80	9.52	9.83	7.23
3	9.36	7.12	0.00	8.37	4.38	4.94	2.94	7.27	6.51	4.81
4	15.69	8.89	8.37	0.00	6.71	9.43	9.12	6.87	6.75	5.07
5	11.66	7.00	4.38	6.71	0.00	4.30	5.14	2.54	3.30	1.90
6	13.37	8.57	4.94	9.43	4.30	0.00	6.08	6.62	6.13	4.52
7	7.71	5.80	2.94	9.12	5.14	6.08	0.00	9.02	8.84	6.17
8	15.81	9.52	7.27	6.87	2.54	6.62	9.02	0.00	1.32	1.21
9	15.17	9.83	6.51	6.75	3.30	6.13	8.84	1.32	0.00	1.13
10	12.13	7.23	4.81	5.07	1.90	4.52	6.17	1.21	1.13	0.00

women. This dimension was reflected in the first discriminant function, which accounted for most of the variance in the criterion groups. Moreover, it was equally important in all three separate analyses. Among the environmental variables, having a bachelor's degree and attending graduate school were the best predictors of careers in the natural sciences, social service/social sciences, and teaching. Lack of these qualifications tended to predict more often choices in office work and as a housewife.

The analysis with only the personal variables as predictors suggests that high scores in mathematics as well as other aptitudes (English, reading comprehension, etc.) predict career choices in the natural sciences, social service/social sciences, teaching, and the professions, whereas women who named "housewife"or "office work" as their choices tend to score much lower on aptitude and achievement tests. However, the aptitude variables accounted for less of the variance in differentiating the career groups than did the educational measures reflected in college attendance and completion. That is, the personal variables explained 37.3 percent of the variance, compared with 53.8 percent which was explained using the 13 environmental variables only.

The third analysis included both sets of predictor variables (personal and environmental). It appears that when both aptitude test scores obtained in high school and post-high school educational variables are introduced, the latter again emerge with higher weights in the prediction of career outcomes among women. The predictor variables--college graduation, mathematical aptitude, general wealth of information, and specific information on literature--were predictive of career choices in the natural sciences, social service/social sciences, and teaching.

However, the single best predictor was attainment of a B.A. degree. Although the first function in the third analysis accounted for 53.4 percent of the variance, similar to the analysis utilizing only the 13 environmental variables, the overall predictive value of the battery with the 49 variables was somewhat better since it resulted in a hit rate of 50.4 percent compared with the hit rate of 49.9 percent using the 13 post-high school environmental variables.

Marital status or home commitment, the second dimension, appeared in the analysis employing only the 13 environmental variables. That is, being married and having children emerged as important predictor variables in separating the occupational groups after the educational status variables had been controlled. However, when the personal variables were also included, i.e., in the third analysis marital status carried weights only in the third and fourth discriminant functions of that analysis.

Career commitment--as measured by early career plans--emerged in the second discriminant function of both the first and third discriminant analyses separating the health group from all other career groups and, more specifically, from the arts and teaching groups. The predictive variables with high weights were twelfth grade career choices in these groups.

The dimension termed masculinity-femininity separated the natural sciences, the professions, and social service/social sciences choices from careers in office work, the health fields, and teaching. This dimension was reflected in the variables that separated the groups in the third discriminant function.

Multiple Regression Analysis

For each of the predictor variable sets (personal, environmental, and the two combined) a multiple regression analysis was performed. Table 12 presents the multiple correlations and the beta weights of those personal variables whose beta weight was .06 or greater.

The multiple correlation coefficients for all ten occupational groups are significant at the .01 level, although for four of them, the 36 predictor variables employed explained 10 percent or less of the variance in the criterion, (i.e., the professions, the arts, social service/social sciences and office work). The highest multiple correlation was observed in the teaching career group ($\underline{R}$ = .519). The three highest beta weights were choice of a teaching career while in high school (.21), aspirations for a college degree (.16), and aspirations for an advanced degree (.13). Moreover, initial choices in the natural sciences, the professions, the health fields, and office work carried negative weights in predicting a career choice in teaching five years after high school. The health fields as a career outcome was second in accuracy of prediction from the twelfth grade personal variables ($\underline{R}$ = .494). The highest beta weight (.38) was initial choice of a career in the health fields. On the other hand, early choices in most of the other fields were negative predictors of a later career choice in the health fields, as was planning to get an advanced degree (-.06).

The personal variables that predicted housewife as a career outcome explained 13 percent of the variance ($\underline{R}$ = .361). Failure to plan on getting a college degree (-.13), lack of aspiration for an advanced degree, (-.12), and early choice of becoming a housewife (.12) had the three largest beta weights.

TABLE 12

MULTIPLE CORRELATIONS AND BETA WEIGHTS: 36 PERSONAL VARIABLES

Variables	Groups									
	Natural Sciences	Profes-sions	Teaching	Health Fields	Business	Arts	Social Service/ Sciences	Office Work	House-wife	Miscel-laneous
"Natural Sciences"	.19	-.06	-.07	-	-	-	-	-	-	-
"Professions"	-	.18	-.09	-	-	-	-	-	-	-
"Teaching"	-.08	-	.21	-.12	-.08	-.07	-	-	-	-
"Health Fields"	-	-.06	-.10	.38	-	-	-	-	-	-
"Business"	-	-	-	-.08	.08	-	-	.07	-	-
"Arts"	-	-	-	-.07	-	.22	-	-	-	-
"Social Service/ Science"	-	-	-	-	-	-	.14	-	-	-
"Office Work"	-	-	-.10	-.13	-	-.06	-.06	.18	.11	-
"Housewife"	-	-	-	-.07	-	-	-	-	.12	-
"Miscellaneous"	-	-	-	-.07	-	-	-	-	-	.11
Plans for college degree	-	-	.16	-	.08	-	-	-.07	-.13	-
Plans for advanced degree	.09	-	.13	-.06	-	-	.12	-.09	-.12	-
Multiple R	(.342)	(.258)	(.519)	(.494)	(.168)	(.297)	(.272)	(.318)	(.361)	(.225)

Note: Only the variables with Beta weights of .06 or higher are included.

The largest beta weight (.19) in predicting a career choice of natural scientist was planning in high school to pursue a career in the natural sciences. The next largest weight (.09) was aspiration for an advanced degree. The multiple correlation employing the 30 personal variables in the prediction of the natural sciences group was .342.

The multiple regression coefficients for the professions, business, the arts, social service/social sciences, and office work groups were very low. For most of them, the 30 personal variables accounted for 10 percent or less of the variance. Nevertheless, the variable that carried the largest beta weight in the prediction of each of these five career outcomes was a similar career choice in the twelfth grade.

All multiple correlations using the thirteen environmental variables were significant (see Table 13). In only three groups, however, teaching ($\underline{R}$ = .575), housewife ($\underline{R}$ = .491), and office work ($\underline{R}$ = .33) was 10 percent or more of the variance explained by the 13 environmental variables. The highest beta weight (.40) in the prediction of teaching as a later career choice was having graduated from college. Having attended more than one college as opposed to having dropped out or not having matriculated at all carried a beta weight of .19. Having been or being in graduate school also carried a significant weight (.08).

Of the 13 environmental variables, the best predictor of planning to be a housewife was being married (.35). Number of children also carried a positive weight (.11). On the other hand, having a B. A. degree (-.11) or having transferred colleges (-.10) were negative predictors. Regarding the prediction of office work as a career plan, the only variable with a high negative beta weight was having a B. A. degree (-.29). Being married and having children were also negative predictors of career choices in

TABLE 13

MULTIPLE CORRELATIONS AND BETA WEIGHTS: 13 ENVIRONMENTAL VARIABLES

Variables	Groups									
	Natural Sciences	Profes-sions	Teaching	Health Fields	Business	Arts	Social Service/ Sciences	Office Work	House-wife	Miscel-laneous
Single	-	.07	-	-	-	-	-	-	-	-
Married	-	-	-	-	-	-.09	-.06	-.20	.35	-.14
Children	-	-	-	-.09	-	-	-	-.11	.11	-
B.A. degree	.10	-	.40	-	-.11	-	-	-.29	-.12	-
Transferred colleges	-	-	.19	-	-	-	.06	-.11	-.10	-
Graduate school attendance	.14	-	.08	-.08	-	-	-	-	-	-
Multiple R	(.209)	(.156)	(.575)	(.140)	(.112)	(.126)	(.208)	(.333)	(.491)	(.170)

Note: Only the variables with Beta weights of .06 or higher are included.

office work indicating that single women without a college education or specialized training are likely to have such jobs as secretary.

The multiple correlations and the beta weights utilizing all 49 variables in the prediction of the ten career groups are shown in Table 14. The 49 variables utilized were the best predictors of a teaching career ($\underline{R}$ = .635). The next most easily predictable career outcomes were housewife, and the health specialists; over 26 percent of the variance in both cases was explained by the 49 predictor variables.

The variables best predicting a career choice in teaching, five years after high school, were having a B.A. degree (.37) and having transferred while in college (.20). Planning to enter a teaching career at the time of the twelfth grade assessment was also a significant predictor (.15) of the same choice five years later.

The variables related to choosing the role of housewife were mainly the familial status variables: being married (.36) and having children (.10).

Regarding the choice of one of the health fields, it is interesting to note again that the largest positive beta weight was the choice of a career in the health fields while in high school (.38). Of all the early career choices that predicted later outcomes, this one carried the largest weight in predicting a similar outcome later on. Moreover, women choosing careers in the health fields were the most unlikely to have planned in high school to go into careers in office work or teaching. These two variables had beta weights of -.13 and -.12 respectively.

Those choosing careers in office work were unlikely to have graduated from college (-.25) and were most likely to have named office work as their future career while in high school (.22).

TABLE 14

MULTIPLE CORRELATIONS AND BETA WEIGHTS: 49 PERSONAL AND ENVIRONMENTAL VARIABLES

Variables	Groups									
	Natural Sciences	Profes-sions	Teaching	Health Fields	Business	Arts	Social Service/ Sciences	Office Work	House-wife	Miscel-laneous
Total information	-	-	-.06	.06	.07	-	-.07	-	-	-
Mathematics total	-	-	-	-	.10	-	-	-.06	-	-
Physical science interest	.07	-	-	-	-	-	-	-	-	-
Social service interest	-	-	-	.06	-	-	-	-	-	-
Business/managerial interest	-	-.07	-	-	.06	-	-	-	-	-
"Natural Sciences"	.20	-	-.09	-	-	-	-	.06	-	.06
"Professions"	-	.19	-.10	-	-	-	-	-	-	-
"Teaching"	-.07	-	.15	-.12	-.06	-.08	-.07	.07	-	-
"Health Fields"	-	-	-.06	.37	-	-.06	-	-	-.10	-
"Business"	-	-	-	-.08	.09	-	-	09	-	-
"Arts"	-	-	-	-.07	-	.20	-	-	-	-
"Social Service/ Sciences"	-	-	-	-	-	-	.16	-	-	-
"Office Work"	-	-	-.07	-.13	-	-.08	-	.22	-	-
"Housewife"	-	-	-	-.06	-	-	-	-	-	-

Variables	Groups									
	Natural Sciences	Profes-sions	Teaching	Health Fields	Business	Arts	Social Service/ Sciences	Office Work	House-wife	Miscel-laneous
"Miscellaneous"	-	-	-	-.06	-	-	-	-	-	.10
Plans for college degree	-	-	-	-	.07	-	-	-	-	-
Plans for advanced degree	.07	-	-	-	-	-	.08	-	-	-
Worked full time	-	-.07	-	-	-	-	-	-	-	-
Single	-	.08	-	-	-	-	-	-	-	-
Married	-	-	-	-.06	-	-	-	-.22	.36	-.12
Children	-	-	-	-.06	-	-	-	-.11	.10	-
A.A. degree	-	-	-	-	-.08	-	-.07	-.06	-	-
B.A. degree	-	-	.37	-	-	-	-	-.25	-.10	-
Advanced degree	-.06	-.06	.10	-	-	-	-	-	-	-
Transferred colleges	-	-	.20	-	-	-	-	-.08	-.10	-
Graduate school attendance	.12	-	.08	-.06	-	-	-	-	-	-
Multiple R	(.366)	(.289)	(.635)	(.505)	(.195)	(.307)	(.303)	(.396)	(.518)	(.251)

Note: Only the variables with Beta weights of .06 or higher are included.

The multiple regression coefficients for the natural sciences, the professions, social service/social sciences, business, and the arts groups were all rather low (with only 15 percent or less of the variance accounted for by the 49 predictor variables). However, on viewing the beta weights for each career category the variable indicating a similar career choice while in high school carried the highest weight.

Comparing the relative predictive value of all three sets of predictor variables, we find that the battery of 13 environmental variables resulted in the highest multiple correlation in the prediction of teaching, housewife, and office work five years after high school. On the other hand, the 36 personal variables descriminated best the health fields, the natural sciences, the arts, the professions, social service/social sciences, and business groups. Nevertheless, the third regression analysis, which used both sets of variables, yielded the best results.

In summary, early career choices and educational attainment after high school are the best predictors of career outcomes five years after high school. Marital status and children are also important in differentiating the women who plan to be housewives, from others who plan to take jobs. The multiple regression analysis substantiated the results obtained and reported earlier, using the multiple discriminant analysis method. With the multiple discriminant method, however, one achieves a clearer picture of how one career choice is related to or distinguished from other choices.

Stability and Change in the Career Plans of Young Women

Thus far, we have attempted to examine the personal characteristics of twelfth grade girls that predict their vocational choices five years after high school. We have also examined the work, educational, and family experiences after high school that influence these career choices. In this section, stability and change in career plans of young women following high school is examined. Our primary aim is to identify the personal and intellectual characteristics of women who persist in a career choice, as opposed to those who change their plans.

The career expectations of 17,009 (or 7,901,372 weighted sample N) young women were examined during the twelfth grade and again five years after high school. Tables 15 and 16 present the distribution of career choices and the shifts that occurred during the five-year period after high school. In the twelfth grade, the three most favored choices were teaching, the health fields, and office work. The fewest career choices, among high school senior girls, were those in the natural sciences, and in the professions. Moreover, these two unpopular choices become even less popular over time. Five years after high school, they had lost more than half of their former recruits. The health fields and office work suffered similar losses. The popularity of teaching remained about the same, and the choice of housewife almost quadrupled. Examining the stability rate of the various choices, we find that it is highest for occupational groups considered feminine, in that they usually attract more women than men. That is, more women that chose teaching, the health fields, office work, the arts, and housewife earlier tended to indicate similar preferences five

TABLE 15

CAREER CHOICE DISTRIBUTION OF WOMEN IN THE 12TH GRADE (1960) AND 5 YEARS AFTER HIGH SCHOOL (1965)[a]
(In Percentages)

	1960	1965	Stability Rate
Natural Sciences	1.8	.6	14.6
Professions	2.1	.8	5.1
Teaching	17.6	15.3	46.9
Health Fields	12.5	6.2	33.5
Business	3.1	2.0	5.2
Arts	3.1	2.0	25.0
Social Service/Science	3.4	2.3	19.1
Office Work	27.7	15.9	27.9
Housewife	10.7	38.4	60.2
Miscellaneous	18.1	16.5	26.3

[a]The percentages in this table represent population estimates. They are based on a weighted N of 7,901,372 cases.

TABLE 16

PROPORTIONS SHIFTING FROM EACH CAREER CHOICE BETWEEN THE 12TH GRADE AND 5 YEARS AFTER HIGH SCHOOL
(In Percentages)

1960	1965									
	1	2	3	4	5	6	7	8	9	10
Career Groups	Natural Sciences	Profes-sions	Teaching	Health Fields	Business	Arts	Social Service/ Sciences	Office Work	House-wife	Miscel-laneous
1	14.6	.9	26.3	4.6	2.0	1.4	8.0	8.3	12.9	21.1
2	1.3	5.1	12.0	12.2	1.1	1.3	5.2	6.2	33.0	22.6
3	.3	1.4	46.9	1.6	2.5	3.0	3.6	8.4	23.2	9.2
4	1.3	0.8	8.3	33.5	0.6	0.2	1.1	8.4	29.3	16.6
5	-	2.1	10.5	0.5	5.2	0.2	0.7	26.4	41.3	13.1
6	0.2	2.4	11.9	2.1	5.1	25.0	3.4	7.9	28.8	13.2
7	-	2.9	22.8	4.7	1.6	0.7	19.1	5.4	27.3	15.3
8	-	.1	2.7	.8	2.5	1.2	.4	27.9	49.4	14.9
9	.1	.2	5.0	3.5	.5	.5	.3	13.7	60.2	16.1
10	.2	.3	14.1	3.0	2.0	1.4	1.8	14.6	36.4	26.3

Note: The career shifts presented in this table are based on a weighted N of 7,901,372 cases.

years later, whereas women initially choosing the professions or business careers tended to change those choices.

An examination of Table 16 indicates that most persons who changed from their initial field tended to move into teaching careers, office work or the housewife category. Changes into natural sciences or professions occurred much less frequently. Thus, again, it seems that shifts take place toward choices that are considered feminine, more appropriate for women. This finding is similar to those reported in earlier studies (Davis, 1965; Werts, 1966; Astin, 1968). People usually change their career plans to occupational groups whose members are more similar to themselves.

This increasing homogeneity within groups may result from what the self and others consider appropriate behaviors for women. However, changes may also occur as a result of growing awareness of what skills and aptitudes are necessary and appropriate as well as of the length of time and commitment required to complete training in and pursue certain occupations successfully. To discover how much awareness may influence choice, we examined the similarities and differences among persons planning the same careers over time and those shifting their choices.

Since earlier studies (Astin 1967, 1968) suggested that career changes occur as a result of personal development and educational experiences that enable students to define goals more realistically, three main hypotheses were tested with the data reported here. First, girls who change from an initial career choice in the fields of natural science, teaching, or the professions tend to obtain lower scores on measures of aptitude and achievement than girls who maintain their initial choices in these fields. Similarly, girls who initially aspire to careers as either housewives or

office workers will be more likely to change their plans if they make relatively high scores on measures of aptitude and achievement. Second, girls who change their early career plans, compared with those who stick with their plans, will score lower on measures of those interests most characteristic of girls choosing that particular career field. Finally, as a result of the patterns in career shifts over time, the career groups will become more differentiated from one another in terms of the personal characteristics of the individuals in the group.

On the basis of the first hypothesis, it was predicted that the defectors from each one of the career-oriented occupational groups (natural sciences, teaching, the professions, and social service/social sciences) would score significantly lower on the ability measures employed than would the stables in these groups.[3] In addition, it follows that the defectors from the housewife and office work groups would score significantly higher than the stables in these two groups. Table 17 presents the means and standard deviations of the subgroups as well as the mean differences among the three subgroups--stables, defectors, and recruits--on eight aptitude and achievement measures.

The eight measures chosen were Information Total, English Total, Mathematics Total, Reading Comprehension, Abstract Reasoning, Creativity, Mechanical Reasoning, and Grades.

An examination of Table 17 indicates that the defectors form the four career-oriented groups (natural sciences, the professions, teaching,

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[3] A stable was a person who had the same career plans in the twelfth grade and five years later. A defector was a person who had different plans at the time of the five-year follow-up from the plans she expressed in the twelfth grade. A person was classified as a recruit to an occupational group five-years after high school if she had different career plans in the twelfth grade.

TABLE 17

MEAN DIFFERENCES OF STABLES, DEFECTORS, AND RECRUITS WITHIN CAREER GROUPS ON EIGHT APTITUDE AND ACHIEVEMENT MEASURES

Career Groups	Total Information			English Total			Mathematics Total			Reading Comprehension			Abstract Reasoning			Creativity			Mechanical Reasoning			Grades		
	Mean	SD	t ratio	Mean	SD	t ratio	Mean	SD	t ratio	Mean	SD	t ratio	Mean	SD	t ratio	Mean	SD	t ratio	Mean	SD	t ratio	Mean	SD	t ratio
Natural Sciences																								
Stables	295.9	31.1	4.50**	102.2	5.6	4.71**	43.0	6.4	4.00**	45.0	2.8	3.66**	12.1	1.9	2.03*	13.4	3.2	2.19*	14.0	3.2	2.76	4.9	0.8	3.44**
Defectors	268.8	44.9	1.35	97.2	7.7	2.22*	37.6	10.0	1.65	41.6	7.2	2.42*	11.4	2.5	0.28	12.2	3.8	0.93	12.4	4.1	0.60	4.4	0.9	2.46
Recruits	285.8	35.8	-2.09*	99.3	6.2	-1.42	40.3	8.9	-1.42	42.8	5.7	-0.93	11.9	1.7	-1.25	12.7	3.4	-0.68	13.6	2.8	-1.50	4.4	0.9	0.04
Professions																								
Stables	264.7	35.6	2.09*	98.8	7.0	2.74*	35.6	10.0	2.95**	43.1	3.2	3.34**	11.4	2.3	2.09*	11.4	3.3	0.94	12.2	3.5	2.41	4.4	0.9	2.02
Defectors	246.1	52.7	-0.22	93.5	11.6	0.60	29.9	11.2	0.80	38.4	8.6	0.87	10.4	2.8	0.79	10.8	4.0	-1.22	10.6	3.7	1.45	4.0	1.0	0.61
Recruits	266.7	42.8	-2.52*	97.9	7.3	-2.51*	33.9	9.8	-2.28*	42.1	6.5	-2.82**	11.1	1.9	-1.53	12.3	3.5	-2.49*	11.1	3.4	-0.80	4.3	1.0	-1.46
Teaching																								
Stables	249.4	36.9	5.41**	96.9	8.7	4.75**	31.2	9.1	5.30**	40.7	5.8	5.77**	10.9	2.1	3.84**	11.3	3.6	3.00**	10.4	3.6	1.86	4.1	0.9	4.65**
Defectors	235.2	44.9	-0.88	94.2	8.9	1.76	28.0	10.0	0.92	38.1	8.5	0.97	10.3	2.7	-0.05	10.6	3.8	0.17	10.0	3.8	-2.02*	3.9	0.9	-0.04
Recruits	251.4	43.1	-5.74**	96.0	8.9	-3.19**	30.7	9.9	-4.31**	40.4	7.0	-4.63**	10.9	2.3	-3.78**	11.3	3.6	-2.88**	10.9	3.8	-3.55**	4.1	0.9	-4.67**
Health Fields																								
Stables	250.1	36.0	5.49**	95.3	7.1	4.54**	29.6	7.9	4.44**	39.9	5.6	5.36**	10.7	2.2	3.89**	11.1	3.2	2.62*	11.0	3.3	2.71**	3.8	0.9	2.25*
Defectors	230.1	45.8	3.68**	90.9	13.4	3.17**	26.1	10.1	2.59**	36.3	9.0	2.82**	9.9	2.6	1.21	10.3	3.8	1.14	10.1	3.8	2.66**	3.7	0.9	0.19
Recruits	234.3	46.3	-0.91	92.5	10.2	-1.25	27.3	9.4	-1.23	37.9	8.2	-1.79	10.4	2.3	-2.10*	10.7	3.6	-1.06	10.0	3.7	0.35	3.8	1.0	-1.68
Business																								
Stables	217.6	38.7	1.14	91.4	8.2	1.63	29.1	8.8	3.79**	34.8	10.9	0.64	10.1	2.8	0.90	8.7	3.9	-0.82	9.4	3.9	0.26	4.1	1.0	2.07*
Defectors	208.5	43.3	-2.46*	88.5	9.9	-0.67	23.0	8.6	0.31	33.7	9.0	-1.80	9.6	3.0	-0.53	9.3	3.8	-2.60*	9.3	3.8	-1.05	3.7	1.0	1.77
Recruits	240.6	47.9	-6.47**	92.8	10.2	-3.84**	28.4	11.3	-5.18**	38.1	8.3	-4.43**	10.4	2.6	-2.43*	10.8	4.0	-3.47**	10.3	4.1	-2.45*	3.7	1.0	-0.12
Arts																								
Stables	247.1	44.3	1.11	94.8	10.4	0.27	26.9	10.0	0.78	39.6	8.4	0.25	11.1	2.7	1.08	11.2	3.8	0.54	10.6	3.7	-0.38	3.8	0.9	-0.37
Defectors	241.2	43.7	-0.67	94.5	10.0	-1.04	26.0	8.9	-1.60	39.4	7.6	-1.40	10.8	2.4	0.51	10.9	3.6	-0.06	10.7	3.7	-1.71	3.8	0.9	-1.07
Recruits	251.7	37.8	-1.90	96.4	7.4	-1.50	29.5	9.8	-2.93**	41.2	5.1	-1.97	10.9	2.2	-0.39	11.2	4.0	-0.59	11.6	3.7	-1.81	3.9	1.0	-1.00
Social Service/ Sciences																								
Stables	260.2	34.0	2.85**	99.5	6.5	4.18**	34.7	8.2	4.91**	43.1	3.8	3.40**	11.5	2.1	3.04**	11.6	3.5	1.83	10.1	3.6	0.41	4.2	0.8	2.73**
Defectors	239.1	46.8	0.28	93.4	9.2	1.88	26.8	10.1	0.79	38.8	8.1	1.83	10.3	2.5	1.22	10.6	3.6	0.86	9.8	3.7	-0.82	3.8	1.0	0.08
Recruits	257.9	48.2	-3.42**	96.9	8.2	-3.38**	33.3	9.9	-5.66**	41.0	7.1	-2.40*	11.0	2.2	-2.74**	11.0	4.1	-1.09	10.6	3.9	-1.83	4.2	1.1	-3.49**
Office Work																								
Stables	202.0	37.9	0.11	90.6	8.9	1.01	20.2	6.8	-0.81	33.1	8.6	-0.84	9.4	2.6	-0.60	9.1	3.8	-1.53	8.5	3.3	-1.73	3.7	0.9	1.29
Defectors	201.7	37.8	-3.90**	90.0	9.7	0.76	20.5	6.7	-4.67**	33.6	8.2	-2.63**	9.5	2.5	-1.77	9.5	3.6	-2.26*	8.8	3.4	-4.53**	3.6	0.9	0.62
Recruits	214.1	45.1	-4.98**	90.0	11.9	-0.02	23.0	9.4	-5.20**	34.8	9.0	-2.39*	9.8	2.9	-1.62	9.7	3.8	-1.21	9.6	3.9	-3.69**	3.6	0.9	-0.57
Housewife																								
Stables	208.0	45.4	-3.30**	88.3	12.7	-2.20*	21.3	8.0	-4.20**	33.5	9.3	-2.21*	9.6	2.7	-1.20	9.9	3.4	-1.22	9.4	3.5	-1.37	3.5	1.0	-1.78
Defectors	224.7	51.3	-2.21*	91.2	12.3	-3.43**	25.3	10.2	-3.05**	35.7	9.6	-2.61**	9.9	3.0	-1.59	10.3	4.0	-0.09	9.9	3.8	-0.37	3.7	1.0	-2.43*
Recruits	215.3	42.9	2.64**	90.9	9.7	0.33	23.3	8.8	2.75**	35.2	8.6	0.68	9.9	2.6	0.20	9.9	3.8	1.43	9.5	3.6	1.44	3.7	0.9	0.23
Miscellaneous																								
Stables	199.4	47.1	-5.43**	86.1	12.4	-4.86**	20.2	9.3	-4.78**	31.9	9.2	-5.11**	8.8	3.1	-4.93**	8.5	3.8	-4.28**	9.0	3.8	-1.88	3.4	1.0	-2.58*
Defectors	224.0	47.7	-4.16**	91.1	10.4	-3.18**	24.4	9.4	-4.19**	36.3	8.9	-3.05**	10.1	2.7	-2.77**	10.1	3.8	-3.82**	9.6	3.5	-1.77	3.7	1.0	-2.78**
Recruits	219.9	55.2	1.23	89.7	12.3	1.99*	24.2	10.8	0.31	34.7	10.0	2.65**	9.6	3.1	2.72**	9.9	3.9	0.75	9.6	4.0	-0.04	3.7	1.0	-0.25

For each career group, the t ratios were performed first between stables and defectors, next between stables and recruits and last between recruits and defectors.

*P <.05

**P <.01

and social service/social sciences) scored significantly lower than did the stables on the aptitude and achievement measures employed. Moreover, women in the health fields were also very likely to shift their initial choice if they achieved lower aptitude scores than did the rest of the women in the group. On the other hand, bright women who initially planned careers as office workers and housewives usually changed their plans five years later. Thus, with some exceptions the findings support the first hypothesis. The notable exceptions are in business and the arts; in these fields, although the means of the defector subgroups were lower than those of the stables, the differences are not statistically significant.

It appears that, with respect to choices in the arts and business, factors other than academic aptitude are important in decisions to continue pursuing careers in these fields. Perhaps an interest in business and artistic ability are more important in these career choices than are scholastic aptitudes. However, the Mathematics Total score and high school grades differentiated the defectors from the stables in the business group.

Of all eight aptitude and achievement measures employed, only two--Mechanical Reasoning and Creativity--did not differentiate as adequately among the subgroups as did the scholastic aptitude measures. Mechanical reasoning measures an aptitude for mechanical matters, and creativity usually reflects a person's ingenuity.

The second hypothesis implied that stables in the natural sciences will manifest more interest in physical science than will the defectors from this field. Similarly, stables in teaching and in social service/social sciences will show a stronger interest in social service and in literature/and linguistics than will the defectors from these groups. Finally, the

business stables will score higher on business interest than will the defectors. Table 18 presents the results, utilizing the four interest measures mentioned. Stables in the natural sciences, health fields and business groups scored significantly higher on the Physical Science Interest measure than did the defectors. However, the mean differences on Physical Science Interest scale between defectors and stables were not significant for the teaching and professions career groups. Thus, it appears than an interest in physical science differentiates among subjects in the natural sciences but not in the other career-oriented groups (the professions, and teaching). Regarding the Literary/Linguistic Interest scale, the stables in the teaching group scored significantly higher than did the defectors. The same, however, was not true with respect to the Social Service Interest scale.

Of the four interest measures employed, an interest in physical science differentiated the stables from the defectors in natural science, the health fields, and business; an interest in literature and linguistics differentiated the defectors from the stables in the teaching groups; and scores on the Business/Managerial Interest scale differentiated the two subgroups in the business career category.

In order to test the third hypothesis that occupational groups become more homogeneous over time, the means and standard deviations on four ability measures (Information Total, English Total, Reading Comprehension, and Mathematics Total) were computed for the groups as they were constituted in the twelfth grade and as they were constituted 5 years later. An inspection of these results, presented in Table 19, suggests that the general tendency for all groups is to become more homogeneous over time,

TABLE 18

MEAN DIFFERENCES OF STABLES, DEFECTORS, AND RECRUITS WITHIN CAREER GROUPS ON FOUR INTEREST MEASURES

Career Groups	Physical Science			Literary/ Linguistic			Social Service			Business/ Managerial		
	Mean	SD	t ratio	Mean	SD	t ratio	Mean	SD	t ratio	Mean	SD	t ratio
Natural Sciences												
Stables	29.4	5.7	3.84**	26.8	7.6	1.83	22.1	7.7	-0.52	17.5	8.8	1.29
Defectors	25.1	8.1	0.35**	24.7	7.8	-0.28	22.7	7.4	-0.21	16.2	7.2	1.57
Recruits	24.1	8.7	0.62	27.3	8.0	-1.69	22.5	8.2	0.12	14.5	7.8	1.17
Professions												
Stables	20.2	8.4	0.93	25.9	7.7	0.29	25.5	6.1	0.44	15.9	6.7	-1.91
Defectors	18.7	9.3	1.06	25.4	8.6	-0.52	24.9	7.8	-0.63	18.3	7.1	0.68
Recruits	18.2	8.7	0.35	26.8	7.7	-0.98	26.5	8.4	-1.29	14.8	8.1	3.00**
Teaching												
Stables	14.8	8.0	0.12	27.4	7.6	2.54*	30.0	5.5	1.82	18.5	7.1	-0.59
Defectors	14.7	8.3	-4.48**	26.1	8.3	0.79	29.3	5.7	12.69**	18.8	7.5	1.73
Recruits	17.0	9.1	-3.88**	27.1	7.7	-1.88	25.2	7.4	9.30**	17.8	7.5	2.07*
Health Fields												
Stables	18.3	7.3	2.50*	23.4	8.1	1.82	27.3	6.5	1.64	15.6	7.4	0.56
Defectors	16.7	7.7	1.44	22.2	7.9	-1.85	26.4	6.8	0.52	15.2	7.6	-3.35**
Recruits	17.1	9.4	-0.47	25.1	8.9	-3.51**	27.0	6.8	-0.86	18.1	7.1	-3.92**
Business												
Stables	16.5	7.9	2.49*	21.5	9.7	1.21	23.3	8.7	0.05	21.6	7.9	2.09*
Defectors	12.9	7.8	0.86	19.5	8.8	-1.49	23.2	7.7	0.14	18.6	7.7	1.90
Recruits	15.1	8.2	-2.49*	24.3	9.2	-4.86**	23.1	7.8	0.18	18.8	7.2	-0.14

For each career group, the t ratios were performed first between stables and defectors, next between stables and recruits, and last between recruits and defectors.

*P <.05

**P <.01

TABLE 18--Continued

Career Groups	Physical Science			Literary/ Linguistic			Social Service			Business/ Managerial		
	Mean	SD	t ratio	Mean	SD	t ratio	Mean	SD	t ratio	Mean	SD	t ratio
Arts												
Stables	12.0	7.1	-0.21	27.1	8.2	0.04	19.8	8.1	-1.76	14.7	7.7	-0.70
Defectors	12.2	7.4	-3.27**	27.1	8.4	-0.02	21.4	7.7	-3.50**	15.4	7.8	-2.64*
Recruits	16.5	9.7	-4.28**	27.1	8.3	-0.06	24.3	7.9	-2.84**	18.2	8.5	-2.73**
Social Service/Sciences												
Stables	15.7	6.8	1.93	29.3	5.7	1.81	26.3	5.5	-1.17	18.9	6.9	-0.37
Defectors	13.3	7.9	-2.46*	27.0	8.1	1.19	27.7	7.1	1.12	19.4	7.4	0.55
Recruits	19.4	9.2	-6.34**	27.8	7.6	-0.90	25.0	7.4	3.22**	18.2	7.4	1.34
Office Work												
Stables	10.8	7.2	1.70	20.5	8.1	1.65	23.6	7.1	-0.61	18.2	7.4	0.83
Defectors	10.1	6.8	-4.67**	19.7	8.6	-3.37**	23.9	7.0	-2.36*	17.8	7.7	-0.06
Recruits	13.4	7.7	-7.52**	22.6	8.5	-5.53**	24.9	7.6	-2.24*	18.2	7.7	-0.91
Housewife												
Stables	10.2	7.5	-2.46*	19.1	8.6	-4.43**	23.7	7.2	-0.74	14.5	7.3	-2.14*
Defectors	12.1	7.4	-3.17**	23.0	8.5	-3.22**	24.3	6.8	-0.61	16.2	7.9	-4.38**
Recruits	12.1	8.0	0.02	21.2	8.9	2.48*	24.1	7.3	0.35	17.0	7.6	-1.31
Miscellaneous												
Stables	11.3	8.3	-2.11*	20.0	9.4	-4.57**	22.0	7.0	-1.52	15.8	7.5	-1.43
Defectors	13.0	8.5	-2.97**	23.9	8.8	-2.42*	23.1	7.4	-2.70**	16.8	7.6	-0.84
Recruits	13.7	8.9	-1.29	22.0	8.5	3.52**	23.9	7.7	-1.69	16.4	7.9	0.87

For each career group, the t ratios were performed first between stables and defectors, next between stables and recruits, and last between recruits and defectors.

*P <.05

**P <.01

TABLE 19

MEANS AND STANDARD DEVIATIONS OF THE INITIAL AND FINAL COMPOSITION OF THE CAREER GROUPS ON FOUR ABILITY MEASURES

		Ability Measures							
	N	Total Information		English Total		Reading Comprehension		Mathematics Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Natural Sciences									
Initial	375	272.46	44.22	98.01	7.60	42.09	6.78	38.43	9.72
Final	88	292.49	33.16	101.23	5.95	44.27	4.19	42.09	7.50
Professions									
Initial	275	248.70	51.09	94.23	11.24	39.03	8.23	30.72	11.20
Final	86	265.80	39.77	94.29	7.15	42.53	5.36	34.66	9.91
Teaching									
Initial	991	243.79	40.83	95.82	8.87	39.68	7.13	29.93	9.58
Final	1235	250.42	40.21	96.44	8.80	40.54	6.49	30.96	9.53
Health Fields									
Initial	539	238.67	42.99	92.79	11.36	37.86	7.90	27.61	9.41
Final	336	244.04	40.96	94.21	8.52	39.14	6.79	28.74	8.59
Business									
Initial	373	209.29	43.03	88.73	9.83	33.79	9.19	23.51	8.81
Final	138	234.24	46.91	92.45	9.76	37.30	9.05	28.54	10.80
Arts									
Initial	450	242.26	43.89	94.55	10.11	39.40	7.78	26.19	9.15
Final	154	249.26	41.46	95.54	9.16	40.35	7.11	28.10	10.01
Social Service/ Sciences									
Initial	248	242.94	45.45	94.50	9.07	39.59	7.73	28.19	10.21
Final	162	258.56	44.71	97.60	7.86	41.57	6.46	33.71	9.47

TABLE 19--Continued

	N	Ability Measures							
		Total Information		English Total		Reading Comprehension		Mathematics Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Office Work									
Initial	1187	201.82	37.85	90.18	9.47	33.45	8.34	20.42	6.73
Final	763	208.23	42.17	90.29	10.60	34.02	8.85	21.62	8.36
Housewife									
Initial	370	215.64	48.87	89.63	12.58	34.51	9.52	23.16	9.30
Final	1655	214.39	43.25	90.60	10.13	35.01	8.69	23.09	8.70
Miscellaneous									
Initial	579	217.64	48.77	89.84	11.15	35.17	9.14	23.32	9.52
Final	730	215.69	54.31	88.95	12.38	34.13	9.86	23.39	10.63

Note: Initial represents the 1960 survey, and Final the 1965 follow-up survey.

as is indicated by the smaller standard deviations for the final composition of the groups. Moreover, there are gains in the overall ability level of the women in most of the final career groups, reflected in the mean score increases. The greatest mean increases on aptitude, over time, occurred in the natural sciences, the professions, the health fields, teaching, and business. The mean aptitudes of the housewife and miscellaneous groups were lower five years after high school.

On the basis of the findings reported with respect to the patterns of change and stability in career plans, it appears that greater differentiation among groups indeed occurs over time. The brighter women either raise their aspirations, or maintain their earlier high aspirations. On the other hand, less academically able women plan careers that are less demanding with respect to abilities and required training.

Summary and Implications

The study reported here utilized longitudinal data collected by and maintained in the data bank of Project TALENT. The sample consisted of high school senior girls who were surveyed in 1960; and followed up in 1965. The study was designed to explore the career development of women during the five-year period after high school. Our primary interest was in isolating predictor variables--in this case, personal characteristics as high school seniors and environmental experiences during the period that followed--of career outcomes five years after high school. The study addressed itself to three specific questions:

1. What are the personal characteristics of twelfth grade girls that predict their vocational choices five years after high school?

2. What are the educational and other environmental experiences since high school that affect women's career plans during these years?

3. What are the personal and intellectual traits of women who persist in a career as opposed to those who change their career plans?

Since we were primarily interested in differentiating career choices on the basis of antecedent variables, the method of multiple discriminant analysis was used.

On the basis of our analysis, we were able to predict the career choices of women five years after high school with varying degrees of accuracy. Some of the antecedent variables were better predictors than others, and some choices could be predicted with greater accuracy than others.

Invariably, the post-high school behaviors with respect to education and marital status were the best environmental predictors of career outcomes. For example, going to college and receiving a B.A. degree were predictive of plans to pursue careers in the natural sciences, the professions, and teaching. On the other hand, being married and having children were predictive of plans to be a housewife. In addition to the post-high school behaviors, certain personal characteristics at the time of the senior year in high school were found to be predictive of career outcomes five years later. In particular, aptitudes and expressed interests differentiated among the girls with different career choices. For instance, high overall scholastic aptitude differentiated girls with aspirations in natural sciences, teaching, and the professions. Early interest and initial career of choice of one of the health fields or the arts predicted similar choices later on. Moreover, variables that would be termed masculine--i.e., an interest in mechanical matters and in physical science as well as high aptitude in mathematics--differentiated girls with an orientation in fields more often favored by men than by women: e.g., the natural sciences and the professions, as opposed to teaching and the health fields.

In summary, girls who in high school score high on scholastic aptitudes, especially on mathematical ability, and who plan to pursue higher education and aspire to an advanced degree, usually choose fields that require a greater career commitment: The natural and social sciences, the professions, and teaching. Plans to do office work or to be a housewife are usually made by girls with less aptitude and fewer academic interests. If these girls get married, they are more likely to plan to be housewives, but if they remain single, they tend to pursue office work.

Girls who have an interest in social service, and the health fields but little interest in pursuing advanced education usually continue to choose those careers. Full-time employment after high school graduation, an early interest in business and management, a B.A. degree, and unmarried status proved to be the best predictors of plans to pursue a business career.

Plans to be some kind of artist are best predicted by similar plans at an earlier age and by interests and aptitudes in artistic endeavors.

From these results, one may conclude that, despite the great instability of the career plans between the high school senior year and five years later (close to one-half of the twelfth grade female population changed their career plans during this period), still there are early patterns and interests that predict later career outcomes. Since, at the time of high school graduation, many women must decide whether to continue their education or to go to work, couselors and educators should assume the responsibility of guiding these young women and helping them make the educational and vocational plans most appropriate for them and most responsive to the needs of society. This kind of help is most necessary for women planning to pursue careers that require specialized training.

Appropriate guidance becomes even more crucial for girls who have low aspirations in high school, and who later find out that doing office work or being a housewife is not commensurate with their interests or abilities. If they recognized and appreciated their skills at an earlier age, they might be better able to make wise decisions at that time.

Looking at patterns of stability and change in career choices, we find that the less scholastically capable girls defect more often from careers that require high aptitudes and long, rigorous training. Conversely,

brighter girls are likely to change initial plans of being housewives and office workers. These observations can be interpred in a number of ways. Since the brighter students who as seniors name the natural sciences, the professions, and teaching as their favored occupations usually maintain their plans over time, it may be that the more capable students are more perceptive about their own interests and aptitudes at an earlier age and thus able to choose careers that are more realistic and more appropriate to their personal qualities. The intellectually less capable, on the other hand, tend to make relatively unrealistic career plans which they must change later on. Another interpretation is that, as students mature, their educational and vocational goals become more realistic and more consistent with the aptitudes and skills required for successful educational and vocational experiences. Thus the whole process may be inevitable and totally dependent on maturation.

One of the interesting results of these shifts in and out of different occupational groups is that within-group homogeneity--with respect to measured aptitudes--increases and that talent becomes more evenly distributed across the different occupational categories. Both outcomes can be viewed in positive ways. That intellectual talent becomes better distributed as a result of the shifts has favorable implications for the overall development and utilization of our human resources. However, that the shifts entail the greatest defection from the sciences and the professions and into more feminine occupations is distressing. Having interests and skills that are like those of the rest of the group members may be psychologically comforting and less anxiety producing. But homogeneity may have negative effects in the long run first, because it perpetuates

sexual inequalities, and second, because it allows the maintance of possibly out-moded entrance requirements as well as of standards about what constitutes acceptable performance in a field. Thus, as long as women are overchoosing teaching, and men the physical sciences, it remains difficult for a man to become an elementary school teacher and a woman, a physicist, whatever their own desires and interests and the benefits to society that such "unconventional" choices would produce. Moreover the practice of law, the workings of the courts, the planning of cities and other such areas where women might make a contribution will remain the same as long as men are the predominant figures in these fields.

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APPENDIX A

LIST OF VARIABLES AND TABLES

Appendix A

Variables Utilized in the Study.[1]

Personal Variables:

A. Information Scores

1.	Literature	(R-103)
2.	Mathematics	(R-106)
3.	Mechanics	(R-112)
4.	Art	(R-131)
5.	Grand Total Information	(R-100)

B. Aptitude and Achievement Scores

1.	English Total	(R-230)
2.	Reading Comprehension	(R-250)
3.	Creativity	(R-260)
4.	Mechanical Reasoning	(R-270)
5.	Mathematics Total	(R-340)
6.	Abstract Reasoning	(R-290)

C. Temperament Scales

1.	Impulsivity	(R-603)
2.	Sociability	(R-601)
3.	Mature Personality	(R-610)

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[1]The 36 personal predictor variables were selected from the measures developed by Project TALENT. A more detailed description of these variables can be found in John Flanagan et al., Technical Report, Coop Research Project No. 635, 1964, University of Pittsburgh, Project TALENT Office, USOE.

The 13 environmental variables were selected from the items on the five-year follow-up questionnaire. See copy of questionnaire in Appendix B.

Note: The capital letters and numbers in parentheses represent those used in Project TALENT data.

D. Interest Measures

1. Physical Science (F-701)
2. Literary/Linguistic (F-704)
3. Social Service (F-705)
4. Business/Managerial (F-710)

E. 12th Grade Career Choices

1. Natural Sciences
2. Professions
3. Teaching
4. Health Fields
5. Business
6. Arts
7. Social Service/Social Sciences
8. Office Work
9. Housewife
10. Miscellaneous

F. Guidance Experiences

1. Counseling regarding College Plans (SIB-118)
2. Counseling regarding Occupational Planning (SIB-119)

G. Grades in High School

A = 6, D or less = 1 (SIB-113)

H. Life Goals

1. Plans to obtain College Degree (SIB-304)
2. Plans to obtain an Advanced Degree (SIB-304)

I. Health Status (SIB-243)

Excellent = 3

Average = 2

Poor = 1

J. Socioeconomic Index (P-801)

K. Father's Encouragement to Attend College (SIB-308)

If encouraged = 2, if not = 1

Environmental Measures:

A. Educational Experiences

1. High school diploma: Yes = 2, No = 1
2. Have you attended college: Yes = 2, No = 1
3. Degrees earned:

A.A. = 2, all others = 1

B.A. = 2, all others = 1

M.A./M.S., Ph.D. or Ed.D. = 2, all others = 1

4. Schools attended: If more than one = 2

If one = 1

5. Attended or attends Graduate School: Yes = 2

No = 1

B. Occupational Experiences

1. As of October 1965 were you looking for a job?

Yes = 2, No = 1

2. How many full time jobs have you had?

None = 1, one or more = 2

3. Have had four or less jobs = 1

Have had five or more jobs = 2

C. Familial Status

1. Marital Status: Single = 2, all other = 1

Married = 2, all others = 1

2. Number of Children

TABLE 1

GROUP MEANS AND STANDARD DEVIATIONS OF THE CONTINUOUS VARIABLES

Variables	Natural Sciences	Profes-sions	Teaching	Health Fields	Business	Arts	Social Service/ Sciences	Office Work	House-wife	Miscel-laneous
Information										
Literature	20.7	18.5	17.7	16.6	16.2	17.9	18.8	14.1	14.5	14.6
Art	9.6	8.6	8.4	7.9	8.1	9.0	8.9	6.9	7.2	7.1
Mathematics	19.3	15.3	13.5	12.4	11.1	12.1	14.8	7.5	8.2	8.8
Mechanics	11.5	10.6	9.5	9.7	8.9	9.5	9.5	8.5	8.8	9.0
Total Information	292.5	265.8	250.4	244.0	235.2	249.3	258.6	208.2	214.4	215.7
Aptitude										
English	101.2	98.3	96.4	94.2	92.4	95.5	97.6	90.3	90.6	88.9
Reading Comprehension	44.3	42.5	40.5	39.1	37.3	40.3	41.6	34.0	35.1	34.1
Mathematics Total	42.1	34.7	30.9	28.7	28.5	28.1	33.7	21.6	23.1	23.4
Mechanical Reasoning	13.8	11.6	10.6	10.6	10.1	11.0	10.5	9.1	9.5	9.5
Creativity	13.2	11.9	11.3	10.9	10.3	11.2	11.2	9.4	9.9	9.6
Abstract Reasoning	12.0	11.2	10.9	10.6	10.3	11.0	11.2	9.6	9.8	9.4
Temperament										
Impulsivity	2.4	2.1	2.3	2.2	2.5	2.5	2.4	2.2	2.1	2.2
Sociability	5.8	6.7	7.1	7.2	7.0	6.7	6.6	7.2	7.3	6.8
Nature Personality	15.5	16.6	14.9	14.4	13.7	14.1	15.4	13.2	12.7	12.7

TABLE 1--Continued

Variables	Natural Sciences	Profes-sions	Teaching	Health Fields	Business	Arts	Social Service/ Sciences	Office Work	House-wife	Miscel-laneous
Interests										
Physical Science	27.6	19.0	15.9	17.8	15.4	14.1	18.4	12.1	11.9	13.2
Literature	26.9	26.4	27.3	24.1	23.7	27.1	28.2	21.6	20.9	21.6
Social Service	22.2	26.0	27.5	27.2	23.1	21.9	25.3	24.2	24.0	23.5
Business	16.5	15.3	18.1	16.6	19.4	16.4	18.4	18.2	16.7	16.2
Grades	4.70	4.3	4.1	3.8	3.8	3.8	4.2	3.7	3.6	3.6
SES	106.7	105.5	104.8	102.0	102.4	106.4	106.2	98.4	99.9	99.8

TABLE 2

CAREER GROUP DIFFERENCES ON THE DICHOTOMOUS VARIABLES
(In Percentages)

Variables	Natural Sciences	Profes-sions	Teaching	Health Fields	Business	Arts	Social Service/ Sciences	Office Work	House-wife	Miscel-laneous
High school graduate	100	100	100	100	100	100	100	99	99	99
Looking for job	3	6	5	5	7	13	11	7	3	8
Worked full time	82	71	87	94	95	85	84	97	88	89
Had many jobs	5	-	3	2	6	8	6	5	3	4
Is single	58	76	45	40	57	47	61	41	8	40
Is married	41	23	53	58	40	48	36	54	91	56
Number of children[a]	.10	.06	.25	.35	.38	.47	.14	.52	1.02	.65
College attendance	99	87	98	64	74	81	99	37	35	45
A.A. degree	10	45	22	72	62	53	19	93	90	79
B.A.	90	51	74	25	31	40	75	2	8	18
M.A./Ph.D.	-	-	3	-	-	3	2	-	-	1
Transferred colleges	22	7	28	-	-	1	31	-	-	-
Graduate school attendance	56	27	31	2	8	13	35	-	1	6

[a]The scores on this variable represent mean scores and not percentages.

TABLE 3

POINT BISERIAL CORRELATIONS BETWEEN THE CRITERION MEASURES AND THE PREDICTOR VARIABLES

Variables	Natural Sciences	Profes-sions	Teaching	Health Fields	Business	Arts	Social Service/ Sciences	Office Work	House-wife	Miscel-laneous
Literature Information	.14	.08	.24	.05	.02	.08	.12	-.15	-.19	-.11
Art Information	.10	.05	.16	.02	.03	.10	.09	-.12	-.12	-.09
Mathematics Information	.19	.11	.29	.09	.02	.05	.13	-.20	-.24	-.10
Mechanics Information	.10	.06	.07	.05	-.01	.02	.02	-.09	-.07	-.01
Total Information	.17	.10	.24	.09	.02	.07	.11	-.17	-.20	-.11
English	.11	.07	.20	.04	.00	.05	.09	-.09	-.13	-.14
Reading Comprehension	.11	.08	.22	.07	.01	.07	.09	-.14	-.15	-.13
Mathematics Total	.20	.11	.25	.07	.04	.03	.13	-.18	-.20	-.11
Mechanical Reasoning	.13	.05	.10	.05	.01	.05	.02	-.10	-.09	-.05
Creativity	.10	.05	.13	.04	.00	.04	.04	-.10	-.08	-.08
Abstract Reasoning	.09	.05	.15	.04	.01	.05	.06	-.09	-.09	-.12
Impulsivity	.02	-.01	.02	.00	.02	.03	.02	.00	-.04	-.01
Sociability	-.06	-.02	.01	.01	.00	-.02	-.03	.02	.05	-.04
Mature Personality	.04	.07	.12	.04	.00	.02	.06	-.04	-.11	-.07
Physical Science Interest	.20	.07	.11	.12	.02	.00	.09	-.09	-.17	-.04
Literature Interest	.05	.04	.23	.02	.00	.07	.09	-.08	-.19	-.08
Social Service Interest	-.05	.02	.19	.08	-.04	-.07	.01	-.04	-.08	-.08
Business Interest	-.01	-.03	.06	-.02	.05	-.02	.03	.05	-.05	-.05
Natural Sciences[a]	.30	-.01	.02	-.02	.01	.00	.04	-.05	-.08	.01
Professions	.04	.23	-.04	.06	.02	.01	.05	-.05	-.06	.00
Teaching	-.04	-.01	.42	-.10	-.04	-.04	-.01	-.10	-.14	-.10
Health Fields	-.02	-.02	-.08	.47	-.03	-.04	-.02	-.08	-.09	.00
Business	-.03	-.03	-.09	-.06	.10	-.03	-.02	.07	.06	.00
Arts	-.03	-.01	.04	-.06	.01	.28	.00	-.05	-.04	-.01
Social Service/Science	-.02	.01	.02	.00	.00	.00	.20	-.05	-.05	-.01
Office Work	-.07	-.06	-.23	-.12	-.02	-.08	-.09	.26	.19	-.01
Housewife	-.03	-.02	-.07	-.05	-.01	-.03	-.02	-.03	.14	.01
Miscellaneous	-.02	-.02	-.05	-.06	.01	-.01	-.02	-.03	.02	.12
Grades	.12	.07	.17	.00	.00	.00	.07	-.07	-.13	-.08
Counseling about college	.04	.03	.16	.07	.03	.03	.06	-.08	-.15	-.06
Counseling about occupations	-.02	-.01	-.05	.00	.01	-.02	-.02	.05	.02	.01
Health	.01	.02	.06	.05	.03	.01	.00	-.04	-.06	-.02
Advanced degree goals	.17	.11	.17	-.01	-.02	.04	.17	-.14	-.17	-.03

TABLE 3--Continued

Variables	Natural Sciences	Profes-sions	Teaching	Health Fields	Business	Arts	Social Service/ Sciences	Office Work	House-wife	Miscel-laneous
College degree goals	.01	.01	.29	.02	.05	.06	.02	-.13	-.18	-.07
SES	.07	.05	.19	.01	.01	.09	.09	-.14	-.12	-.08
Father's encouragement	.02	.02	.15	.04	.02	.02	.03	-.07	-.12	-.03
High school graduate	.01	.01	.03	.02	.01	.01	.01	-.01	-.02	-.04
Looking for job	-.01	.00	-.01	-.01	.01	.05	.04	.03	-.07	.04
Worked full time	-.03	-.08	-.04	.04	.03	-.02	-.03	.10	-.02	.00
Had many jobs	.01	-.02	-.01	-.03	.02	.04	.02	.02	-.03	.01
Is single	.07	.11	.13	.04	.08	.05	.10	.06	-.36	.05
Is married	-.06	-.11	-.12	-.03	-.08	-.06	-.10	-.09	.37	-.06
Number of children	-.07	-.08	-.21	-.08	-.04	-.02	-.09	-.03	.34	.03
College attendance	.10	.07	.43	.03	.05	.08	.14	-.19	-.33	-.11
A.A. degree	-.15	-.06	-.51	.03	-.02	-.05	-.18	.23	.34	.11
B.A.	.17	.06	.52	-.03	.00	.04	.17	-.25	-.33	-.11
M.A./Ph.D.	-.01	-.01	.10	-.02	-.02	.04	.02	-.04	-.06	.01
Transferred colleges	.09	.07	.44	.01	.04	.08	.15	-.20	-.32	-.10
Graduate school attendance	.18	.06	.34	-.08	-.02	.01	.13	-.15	-.22	-.06

[a]These ten fields stand for choices made in the 12th grade.

APPENDIX B

FOLLOW-UP QUESTIONNAIRE

12th 5-yr.

UNIVERSITY OF PITTSBURGH

PITTSBURGH, PENNSYLVANIA 15213

January 24, 1966

PROJECT TALENT ALUMNUS--WHERE ARE YOU!

We are eager to learn where you are and what you are doing.

We haven't yet received your answers to this questionnaire. Maybe the copies we recently sent didn't reach you. Anyway, here's another.

It will take you only a few minutes to check your answers to the questions. Please keep your records up to date with us.

Just fill in the answers, sign your name on page 5, fold the booklet so that our return address in on the outside, and mail it back to us.

No stamp is required. Just drop the booklet in the mailbox.

Best of luck to you.

Sincerely,

John C. Flanagan
Professor and Director of Project TALENT

JCF:mls

PLEASE CORRECT YOUR ADDRESS

If your present address or name is different from that on the label on the top of page 5, please correct the label, so that we can keep our record up to date. Please do not remove the address label.

PROJECT TALENT FOLLOW-UP SURVEY

__ __ 1. Date of your birth _____
Month Day Year

2. Check One:
1 ☐ Male
2 ☐ Female
X

3. Did you get a high school diploma?
____ ☐ Yes, when I graduated in _____ (year).
____ ☐ Yes, I dropped out of school, but later returned and got my diploma in _____ (year).
____ ☐ Yes, by examination or through correspondence school after I left high school. (year _____)
____ ☐ No, I dropped out of school in _____ (year).
0 ☐ No, I went through grade 12 but did not get a diploma.
XX

4. As of October 1, 1965, were you looking for a job?
1 ☐ Yes, a full-time job.
2 ☐ Yes, a part-time job.
3 ☐ No, I had a job.
4 ☐ No, I was in school and didn't want a job.
5 ☐ No, I am a housewife.
6 ☐ No, my health would not permit it.
7 ☐ No, for a reason not given above.
X

5. Did you have any paid job as of October 1, 1965?
100 ☐ No. (If this is your answer, skip Question 6 and go to Question 7.)
2** ☐ Yes, a part-time job.
3** ☐ Yes, a full-time job.
} Average no. of hours worked per week: _____ hours.
XXX

6. If you had a paid job as of October 1, 1965:

(a) What was this job called? _____

__ __ (b) What did you do on it? _____

_____

_____

(c) What was your pay (before deductions) when you first started on this job? (Please fill in ONE of the lines.)
**** $ _____ per week
*** or $ _____ per month
*.** or $ _____ per hour
XXX

(d) What was your pay (before deductions) on that job as of October 1, 1965? (Please fill in ONE of the lines.)
**** $ _____ per week
*** or $ _____ per month
*.** or $ _____ per hour
XXX

(e) As of October 1, 1965, how long had you worked on that job?
1 ☐ Less than 2 months.
2 ☐ 2-6 months.
3 ☐ 6-12 months.
4 ☐ 1-2 years.
5 ☐ 2-4 years.
6 ☐ 4-6 years.
7 ☐ More than 6 years.
X

(f) Who was your employer on that job?
0 ☐ Private company with 100 or more employees.
1 ☐ Private company with fewer than 100 employees.
2 ☐ Family business.
3 ☐ Self-employed.
4 ☐ College or university or junior college.
5 ☐ Other educational institutions.
6 ☐ State or local government (except teaching)
7 ☐ Federal Government (U.S.)
8 ☐ Hospital, church, clinic, welfare organization, etc.
9 ☐ Other (Specify) _____
X

PLEASE DO NOT WRITE IN THIS AREA

(g) How do you feel about your present type of work?
4 ☐ Very satisfied with it.
3 ☐ Fairly satisfied with it.
2 ☐ Neither satisfied nor dissatisfied.
1 ☐ Rather dissatisfied with it.
0 ☐ Very dissatisfied with it.
X

(h) Do you plan to remain on this job for at least another year?
1 ☐ Yes.
2 ☐ No. I would like to change jobs, but continue to do the same type of work.
3 ☐ No. I would like to get a job in the same field, but at a more advanced level.
4 ☐ No. I would like to get a job in a different field.
X

7. How many full-time paid jobs have you held between June, 1960 and September 30, 1965? (Circle answer.)

__
X None 1 2 3 4 5 6 7 8 More than 8

8. (a) What occupation do you plan to make your life work? Be as specific as possible. (For instance, if military service, specify type of work.)

__ __ __ _____

_____

_____

(b) What steps have you taken in this direction? Mark as many as apply.
☐ 8 a. I now have a regular job in this field.
☐ 4 b. I now have a job as a trainee in this field.
☐ 2 c. My present job may lead to work in this field.
__ ☐ 1 d. I am doing volunteer work in this field.
☐ 1 e. I have had special training or education in this field.
__ ☐ 9 f. None of the above.

(c) If you have had special training or education in this field, how or where did you get it? (Mark as many as apply.)
☐ 1 a. In high school.
☐ 2 b. In college as an undergraduate.
☐ 4 c. In graduate school or professional school after college.
__ ☐ 8 d. In some other kind of school, since high school.
☐ 1 e. An apprenticeship program.
☐ 2 f. On-the-job training (informal or formal).
__ ☐ 4 g. An informal program: reading or other independent study.
☐ 1 h. Some other way.
__ ☐ 9 i. I have had no special training or education in this field.

9. (a) How many times have you married?
0 ☐ Never
1 ☐ Once
2 ☐ More than once
X

__ __ (b) When did you first marry? _____
Month/Year

10. Your present marital status:
1 ☐ Single
2 ☐ Married
3 ☐ Separated
4 ☐ Divorced
5 ☐ Widowed
X

__ 11. How many children do you have? _____

__ 12. How old is your oldest child? _____

13. Please indicate your past and present status in regard to military duty. (Mark as many as apply.)

(a) Was in	(b) Am now in	
		a. (Active Duty)
☐	☐	1. Air Force
☐	☐	2. Army
☐	☐	3. Navy
☐	☐	4. Marine Corps
☐	☐	5. Coast Guard
		b. (Reserves and National Guard)
☐	☐	1. Air Force Reserve
☐	☐	2. Army Reserve
☐	☐	3. Naval Reserve
☐	☐	4. Marine Corps Reserve
☐	☐	5. Coast Guard Reserve
☐	☐	6. Air National Guard
☐	☐	7. Army National Guard
		c. (ROTC)
☐	☐	1. Air ROTC
☐	☐	2. Army ROTC
☐	☐	3. Naval ROTC
☐	☐	d. 0. None of the above

14. On October 1, 1965, were you on active military duty?

4 ☐ Yes.
3 ☐ No, I have completed my military duty.
2 ☐ No, but I expect to enlist voluntarily.
1 ☐ No, but I expect to be drafted.
0 ☐ No, and I do not expect to be.

*** 15. What is your social security number?
**
****
(X's) ___ ___ ___ - ___ ___ - ___ ___ ___ ___

16. Race:

1 ☐ Oriental
2 ☐ White
3 ☐ Negro
9 ☐ Other (Please specify.): _____
X

17. Religion:

1 ☐ Protestant
2 ☐ Catholic
3 ☐ Jewish
9 ☐ Other (Please specify.): _____
0 ☐ None
8 ☐ I prefer not to answer this question.
X

18. Have you made any important decisions that you are sorry about now? (Mark as many as apply.)

☐ 1 a. I wish I had taken additional educational training after high school to prepare me for a better job.
☐ 2 b. I wish I had graduated from high school instead of dropping out.
☐ 4 c. I'm sorry I didn't go to college.
__ ☐ 8 d. I'm sorry I dropped out of college.
☐ 1 e. I wish I had never gone to college.
☐ 2 f. I'm sorry I didn't select a different college from the one I attended.
__ ☐ 4 g. I wish I had chosen a different major field in college.
☐ 1 h. I'm sorry about the kind of work I decided to do.
☐ 2 i. I wish I hadn't been so young when I got married.
☐ 4 j. Other (Specify.) _____
_____
__ ☐ 9 k. No, I am not sorry about any important decisions I've made.

PLEASE DO NOT WRITE IN THIS AREA

19. Have you attended college (four-year college or junior college) since leaving high school?

1 ☐ Yes, as a full-time student working towards a degree.
2 ☐ Yes, as a part-time student working towards a degree.
3 ☐ Yes, for informal, non-credit courses, or not working towards a degree.
4 ☐ No.
X

20. Did you attend any other type of school?

1 ☐ No.
2 ☐ Yes, a technical institute for electronics, drafting, computer programming, or something similar.
3 ☐ Yes, a school of nursing (3-year program).
4 ☐ Yes, a school of practical nursing.
5 ☐ Yes, a secretarial or business school.
6 ☐ Yes, a trade or apprentice school or vocational school.
7 ☐ Yes, an armed forces enlisted-man's school.
9 ☐ Other. (Please specify.) _____
X

21. Which of the following licenses, certificates, or diplomas have you obtained or do you plan to obtain? (Mark as many as apply.)

(a) Have Rec'd.	(b) Plan to Obtain	
☐	☐	1. Certificate based upon apprenticeship or on-the-job training. (Describe)_____ _____
☐	☐	2. Certificate or license based upon correspondence or other specified courses. (Please describe.) _____ _____
☐	☐	3. Trade school certificate.
☐	☐	4. Business school or secretarial diploma.
☐	☐	5. Practical nursing certificate.
☐	☐	6. RN (Registered Nurse)
☐	☐	7. Certificate from a technical institute.
☐	☐	8. CPA (Certified Public Accountant).
☐	☐	0. None of the above.

(a)
(b)
X

22. Which of the following college degrees or diplomas have you earned or do you plan to earn? (Mark as many as apply.)

(a) Have Rec'd.	(b) Plan to Obtain	
☐	☐	0. None
☐	☐	1. Junior college diploma (e.g. Associate in Arts, etc.)
☐	☐	2. B.A., B.S., B.B.A., B.F.A. (e.g., B.A. in History, B.S. in Ed., etc.)
☐	☐	2. Other bachelor's degree (Specify). _____
☐	☐	3. M.A. or M.S.
☐	☐	3. Other master's degree (Specify). _____
☐	☐	4. Ph.D. or Ed.D.
☐	☐	5. LL.B. (law)
☐	☐	6. M.D. (medicine)
☐	☐	7. D.D.S. (dentistry)
☐	☐	8. Other professional degree (Specify) _____
☐	☐	9. Other (Specify) _____ _____ _____

(a)
(b)
X

ANSWER THE QUESTIONS IN THIS SECTION IF YOU HAVE ATTENDED OR ARE NOW ATTENDING A COLLEGE OR UNIVERSITY FOR CREDIT. IF NOT, PLEASE TURN TO PAGE 5 AND ANSWER QUESTIONS 32, 33, AND 34.

23. What colleges or universities have you attended as an undergraduate? If you have already earned a bachelor's degree, please specify the degree, and the month and year received. (Put the college you last attended or are now attending first.)

Name of College or University	City and State	(a) Dates Attended	(b) Degree Earned	(b) Date Mo.	Yr.

24. Students who have done or are doing graduate work should also complete the following, giving the name of the graduate or professional school they attended.

Name of University	Name of School	City and State	Dates Attended

25. As an undergraduate, in which of the following areas was or is your major in college and which was (is) your minor? (If you did not have a formal minor, mark the other area in which you took the most courses.) Also, if you are a graduate student, what is your graduate major? (Mark ONE for each.)

(a) Undergraduate Major	(b) Minor	(c) Graduate Major	
☐	☐	☐	01. Mathematics
☐	☐	☐	02. Physical Sciences
☐	☐	☐	03. Biological sciences
☐	☐	☐	04. Psychology
☐	☐	☐	05. History
☐	☐	☐	06. Economics
☐	☐	☐	07. Social sciences (other)
☐	☐	☐	08. Social work
☐	☐	☐	09. English
☐	☐	☐	10. Foreign languages
☐	☐	☐	11. Fine Arts
☐	☐	☐	12. Music
☐	☐	☐	13. Philosophy
☐	☐	☐	14. Religion or Theology
☐	☐	☐	15. Law (Pre-Law)
☐	☐	☐	16. Medicine (Pre-Medicine)
☐	☐	☐	17. Dentistry (Pre-Dentistry)
☐	☐	☐	18. Nursing
☐	☐	☐	19. Other health professions
☐	☐	☐	20. Engineering
☐	☐	☐	21. Architecture
☐	☐	☐	22. Elementary education
☐	☐	☐	23. Physical education
☐	☐	☐	24. Education (other)
☐	☐	☐	25. Accounting
☐	☐	☐	26. Business and commerce
☐	☐	☐	27. Home Economics
☐	☐	☐	28. Agriculture or Forestry
☐	☐	☐	29. Some other (please specify.) _____
☐	☐		00. None – I do not intend to earn a bachelor's degree.
		☐	00. None – I am not doing graduate work.

26. Are you enrolled in a college or university this semester?

1 ☐ Yes, as an undergraduate, full-time
2 ☐ Yes, as an undergraduate, part-time
3 ☐ Yes, as a graduate student, full-time
4 ☐ Yes, as a graduate student, part-time
5 ☐ No

27. During the last year you were an undergraduate, did you also hold a job?

☐ Yes. Average No. of hours worked per week:_____ hrs.
☐ No

28. Please indicate your present class status in college (or the highest level you have reached).

1 ☐ Freshman
2 ☐ Sophomore
3 ☐ Junior
4 ☐ Senior
5 ☐ I have already earned a bachelor's degree, and have not done any graduate work.
6 ☐ I have already earned a bachelor's degree, and am or have been a graduate student.

29. As an undergraduate, what is or was your average grade in your major subject, and in all subjects? (Please circle one in each row.)

Major subject: A A– B+ B B– C+ C C– D+ D D– F

All subjects: A A– B+ B B– C+ C C– D+ D D– F

11	10	09	08	07	06	05	04	03	02	01	00

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PLEASE DO NOT WRITE IN THIS AREA

30. Where did you get the funds for your undergraduate college education? (Include tuition and other expenses). (Mark as many as apply.)

☐ 1 a. Loans from the National Defense Education Act Loan Fund.
☐ 2 b. Loans from college loan funds
☐ 4 c. Loans from banks or other organizations
☐ 1 d. Loans from family or friends
☐ 2 e. Parents, family, trust fund, or friends
☐ 4 f. My own savings
☐ 1 g. Working while attending college
☐ 2 h. Scholarships or grants from college attended
☐ 4 i. Scholarships or grants from other sources
☐ 1 j. Other. Please specify: _____

31. Where did you live most of the time while attending college? (Mark an answer for each school year.)

(a) Fresh.	(b) Soph.	(c) Jr.	(d) Sr.	
☐	☐	☐	☐	1. At home – within an hour's commuting time.
☐	☐	☐	☐	2. At home – more than an hour's commuting time.
☐	☐	☐	☐	3. In a college dormitory.
☐	☐	☐	☐	4. In a fraternity or sorority house
☐	☐	☐	☐	5. Away from home in a rented room or apartment.
☐	☐	☐	☐	6. Away from home with friends or relatives.
☐	☐	☐	☐	9. Other. (Specify) _____
	☐	☐	☐	0. I didn't reach that year of college.

Project TALENT is a research study that will make recommendations for improving the education and guidance of American youth. On this page we should like to learn about your experiences and get your recommendations and suggestions.

32. How well have the training and education you have obtained prepared you for an occupation that will make full use of your abilities?

4 ☐ Very well
3 ☐ Fairly well
2 ☐ Not very well
1 ☐ Rather poorly
0 ☐ Very poorly
X

Please explain your answer by describing the strong or weak points in this aspect of your education.

33. How well have the training and education you have obtained prepared you for a full and satisfying life outside of your work?

4 ☐ Very well
3 ☐ Fairly well
2 ☐ Not very well
1 ☐ Rather poorly
0 ☐ Very poorly
X

Please explain your answer by describing the strong or weak points in this aspect of your education.

PLEASE DO NOT WRITE IN THIS AREA

34. How well have the training and education you have obtained prepared you for effective performance of your responsibilities as a citizen?

4 ☐ Very well
3 ☐ Fairly well
2 ☐ Not very well
1 ☐ Rather poorly
0 ☐ Very poorly
X

Please explain your answer by describing the strong or weak points in this aspect of your education.

ADDITIONAL COMMENTS

If you feel you would like to make additional comments on your experiences in high school and in the years since high school, please feel free to do so. Also, you may use this space to explain any of your previous answers.

Please sign your name below and fill in the date.

Signature _____

Month _____ Day _____ Year _____

PLEASE CORRECT YOUR NAME AND ADDRESS

Please correct your name and address on the label on page 6. This helps us to keep your address file with us up to date.

After you have filled out the questionnaire, please fold the booklet so that our return address is on the outside and your corrected address label is on the inside. Then moisten the tab, seal the booklet, and drop it in a mailbox.

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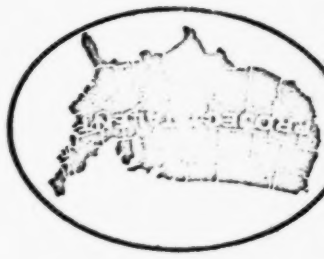

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The purposes of PROJECT TALENT include:

1. **A scientifically planned inventory of all the talents of high school students.**
2. **Determination of the specific patterns of aptitudes, abilities, and interests which provide the best basis for various college courses and careers.**
3. **A better understanding of how young people choose their life work.**
4. **A better understanding of the educational experiences that prepare students for their life work.**

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